

NETWORK WORLD

THE WEEKLY FOR LEADING USERS OF COMMUNICATIONS PRODUCTS & SERVICES

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FEATURE FOCUS

Net diagnostics: terms of confusion

BY LAWRENCE BERNSTEIN
AND CHRISTINE M. YUHAS

Special to Network World

User: My T-1 circuit is still dropping bits. Didn't you test it?

Engineer: Yes, we tested it, and the performance is within specifications.

User: But every time we transmit sales invoices, we have trouble. Your test can't be right.

Engineer: Maybe your operator just doesn't follow the procedures.

What's going on here? The user and engineer are both sure they know what the other means by the term "testing." In fact, the engineer has tested in the usual

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► LOCAL ACCESS RELIEF

AT&T helps SDN user bypass BOC

BY BOB WALLACE

Senior Editor

LOS ANGELES — In an agreement that came to light last week, AT&T has agreed to install for one of its largest Software-Defined Network users a microwave system that bypasses a Bell operating company. The deal is evidence that, despite earlier assurances to the contrary, AT&T has become increasingly willing to help customers out from under the heavy cost of local access.

Gary DeLong, communications and services department manager for Carter Hawley Hale Stores, Inc., a \$4 billion, 310-store retail chain based here, said AT&T approached him to discuss the use of a short-haul, digital microwave system in his network.

"AT&T came to us and said, 'Let's talk about how this

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NETWORK LINE

News

► As expected, 3Com and Microsoft team up to develop and market Microsoft's LAN Manager. The pair plan to promote the network operating system as a "standard for advanced PC

networking." Page 2.

► Arizona opts for a private T-1 network that will replace more than half its 700 leased lines in the wake of an AT&T filing that could hike private-line costs by 90%. Page 2.

► GSA officials unveil a plan to get federal agencies

► RBHC FREEDOM BID

Greene grills Justice on plan to ease MFJ

Hearing marks final stage of ruling review.

BY KARYL SCOTT

Washington, D.C. Correspondent

WASHINGTON, D.C. — U.S. District Court Judge Harold Greene last week challenged a Department of Justice proposal to lift the divestiture rules that prevent the regional Bell holding companies from diversifying into new markets.

Greene held three days of oral argu-

ments to consider Justice Department recommendations for the removal of the restrictions imposed by the Modified Final Judgment. The MFJ bars the RBHCs from long-distance, information services, equipment manufacturing and nontelecommunications businesses.

Attorneys representing the Justice Department, the RBHCs, AT&T, telecommu-

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► DIVERSIFICATION STRATEGY

DCA stalks Fox Research

Digital Communications Associates, Inc. on the acquisition trail

Founded 1972. Based in Atlanta
1986 revenue: \$150M
1987 revenue: \$180M (est.)

Acquisitions: Company Products

June 1987: Fox Research, Inc.
10-NET local networks

October 1986: Microstuf, Inc.
Crosstalk personal computer communications software

September 1986: Cohesive Network Corp.
T-1 multiplexers

February 1986: Forte Communications, Inc.
Personal computer communications products

August 1983: Technical Analysis Corp.
Irma emulation boards for personal computers

10-NET LAN maker enticed by \$10m bid.

BY JOY KALFOPOULOS

Network World Staff

ATLANTA — Continuing its aggressive expansion into new communications realms, Digital Communications Associates, Inc. (DCA) last week agreed to pay \$10 million to acquire Dayton, Ohio-based Fox Research, Inc., maker of the 10-NET line of local networks.

DCA owes much of its financial success to its Irma emulation card for personal computers, but in the last few years the company has mounted an acquisition strategy to enter new markets, including the T-1 multiplexer market. Analysts say the company is trying to reduce its reliance on Irma

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► SATELLITE NETWORKS

Early users give VSATs high marks

BY PAM POWERS

Senior Editor

Although they are still not easy to find, users of VSAT satellite networks are for the most part tickled pink with their decisions to dump dial-up and leased lines in favor of this bypass technology.

Users such as Burlington Coat Factory Warehouse Corp., Southland Corp. and Days Inns of America, Inc. all extol the cost savings, reliability and speed associated with very small aperture terminal networks. Although one user interviewed by *Network World* cited maintenance problems with his VSAT net, all early users said they would highly recommend VSATs to their peers in

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► 3COM, MICROSOFT

LAN Manager boosted

Codevelopment, comarketing planned.

BY PAULA MUSICH

Senior Editor

NEW YORK — As expected, 3Com Corp. and Microsoft Corp. announced a strategic partnership last week to codevelop and jointly market Microsoft's LAN Manager, a network operating system based on IBM's Operating System/2, the system software of IBM's new Personal System/2 microcomputers.

Microsoft and 3Com Corp. also released new details on the LAN Manager, and 3Com announced a

line of networking software based on the LAN Manager as well as upgrades for its existing 3+ servers and software.

Both firms will promote the LAN Manager, with or without IBM's blessing, as "the standard platform for advanced personal computer networking," said Jon Shirley, Microsoft's president. IBM has been mute on whether it will use any or all of the LAN Manager with its Token-Ring Network.

3Com will work to ensure the LAN Manager's compatibility with

IBM's Network Basic I/O System, the International Standards Organization's (ISO) Open Systems Interconnect, IEEE 802.2 and Xerox Network Systems protocols. 3Com will also ensure compatibility with Ethernet and IBM Token-Ring Network adapters, provide performance enhancements and additional network functionality.

3Com will distribute the LAN Manager through its extensive dealer network, and Microsoft will provide OEM distribution, as it has with MS-Net. Microsoft developed the MS-Net network operating system as an adjunct for PC-DOS, the microcomputer operating system it provides IBM for its Personal Computer line. Both companies will participate in other marketing activities, including educational programs for OS/2 LAN Manager applications developers.

How successful Microsoft and 3Com will be in establishing the LAN Manager as a networking standard depends not only on how IBM responds, but on how 3Com's rival Novell responds, analysts said.

"Microsoft and 3Com would like to see LAN Manager established as the industry standard," said Alice Bradie, senior technical analyst of communications at Hambrecht & Quist, Inc., an investment banking

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► PRIVATE NETWORKING

Arizona net avoids AT&T fees

BY BOB WALLACE

Senior Editor

PHOENIX — The Arizona Department of Administration will soon begin replacing more than half of its 700 AT&T leased lines with a private, statewide T-1 network, a move forced in part by an AT&T filing that would raise the cost of private-line services by 90%.

The seven-node system, which will be anchored by a distributed 12,000-line private branch exchange at the state capitol building here, will save the state an estimated \$20 million over the next decade, according to Larry Beauchat, communications director for the Department of Administration.

The central-site PBX will support six remote switch modules using fiber-optic T-1 facilities. The voice traffic of more than three dozen state-owned facilities will be concentrated through these six

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► PUBLIC DATA NETWORKS

GSA's PDN plan may cut federal private-line costs

BY KARYL SCOTT

Washington, D.C. Correspondent

WASHINGTON, D.C. — Officials at the General Services Administration last week announced a multimillion-dollar procurement program intended to encourage government use of public data transmission services.

With the Public Data Network (PDN) plan, the GSA hopes to encourage federal agencies under its jurisdiction — including the Department of Commerce, the Department of State and the Department of the Interior — to use public data network services instead of more costly private-line services.

The GSA will negotiate service contracts with as many as 20 PDN carriers and establish a price schedule with each vendor. Although the GSA will not guarantee the volume of use, the vendor must guarantee a price for service.

The GSA expects to issue a request for information (RFI) this

month. A request for proposal is scheduled to be issued in the third quarter of this year, and contracts are to be awarded before year's end.

The price schedule-type contract is designed to alleviate some of the complications federal agencies encounter when they try to buy data transmission services on an individual basis, according to Thomas Aguilar, director of the Information Services Center at the GSA.

"It's not a simple procedure for an agency to procure data transmission services," he said. "These agencies have little experience in negotiating RFPs with vendors, and in many cases, they avoid the problem by ordering private lines from the phone company."

"Private lines are not the most cost-effective solution in many cases," Aguilar continued. "We are trying to create a simple, easy-to-use and cost-effective procurement method that would be advanta-

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► CREDIT CARDS, OPERATOR ASSISTANCE

Sprint services debut

BY JIM BROWN

New Products Editor

NEW YORK — At a meeting here marking the company's first birthday, US Sprint Communications Co. last week announced a credit card calling service and said its operator assisted services are now available on a nationwide basis.

Availability of the new credit card service and nationwide operator assistance was seen by analysts as an important boost for US

Sprint's image as a full-service long-distance carrier. "US Sprint is getting more and more like AT&T," acknowledged Robert Self, president of Market Dynamics, a New York-based telephone consulting firm.

US Sprint's Fiber Optic Network credit card service (FONCARD) makes use of the company's fiber-optic network and can be accessed through a US Sprint 800 number. FONCARD will replace US Sprint's current Travel Card service by September, said Hal Poel, group product manager for residential and business services. Travel Card, which uses a different scheme to access US Sprint lines, is being phased out in an effort to boost use of US Sprint's fiber-optic network.

The firm said it will charge a 55-cent surcharge for every FONCARD call. AT&T charges an 80-cent surcharge on calls made with its Calling Card service. MCI Communications Corp. levies surcharges of between 55 cents and 80 cents on its credit card calls.

"It seems reasonable that a user

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► ASSOCIATION OF DATA COMMUNICATIONS USERS

ADCU members discuss group's future course

BY JIM BROWN

New Products Editor

ATLANTIC CITY, N.J. — While continuing a tradition of sharing ideas and information, the Association of Data Communications Users (ADCU) members attending the group's 11th annual conference here last week also worked to map out ADCU's future direction.

The roughly 125 members at the conference heard ADCU officials stress the importance of expanding the group's membership and involving more users in ADCU's national standards and public policy committees. ADCU leaders also agreed on the need to create com-

mittees to address these issues regionally, said Michael Kanthal, outgoing ADCU president and a vice-president of corporate telecommunications at Citibank, N.A.

In addition, ADCU revealed that it is considering joining the Corporation for Open Systems as an affiliate member (see related story below). ADCU currently holds a seat on the Exchange Carrier Standards Association's T1D1 committee and is taking part in regional Bell holding company-sponsored Integrated Services Digital Network and Open Network Architecture (ONA) forums.

Chartered to promote information exchange among major users

of data communications, the 12-year-old ADCU boasts 240 member companies and nearly 275 individual members, mostly in the Northeast. Kanthal said a telemarketing membership drive conducted last year was not as successful as he and others had hoped.

Newly elected ADCU President/Treasurer Lewis Haring, who is vice-president for network planning at Chase Manhattan Bank, N.A., spearheaded an effort to establish a network strategic planning committee during the conference.

"Because deregulation issues are moving at such a rapid pace, the emphasis on planning has got to increase," Haring said. AT&T, Nynex Corp. and Racal-Milgo, Inc. are interested in meeting with strategic planning committee members to divulge high-level network and product plans that would influence network planning, he said.

First-year ADCU member Ed Ro-

manowski, a senior systems specialist for E.I. DuPont de Nemours & Co., said he attended the conference to pick up advice on strategic planning. However, he did not join Haring's strategic planning committee, nor did other members attending a session devoted to the topic. "We're trying to use networks to give our salespeople a leg up on the competition," Romanowski said. Strategic planning could help the firm expand its current practice of giving salesmen and customers dial-up access to the IBM and Digital Equipment Corp. systems at the company's Wilmington, Del., headquarters.

In his first year of a two-year term, Haring said he will push for more user-conducted seminars at ADCU regional meetings. He also said he is devising plans to increase attendance at the national gathering.

In addition to Haring, other new

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► STANDARDS

ADCU may join COS as an affiliate

BY JOSH GONZE

Staff Writer

ATLANTIC CITY, N.J. — Top officials of the Association of Data Communications Users (ADCU) revealed last week that the group is considering nonvoting, affiliate membership in the Corporation for Open Systems (COS).

That news met with praise from ADCU members, who were gathered here for the users group's annual meeting. "I think joining COS would definitely be an advantage to us," said Guy Garofano, senior data communications supervisor at Anchor Systems Corp. He said he envisioned seeing results of COS research in a "Consumer Reports"-type publication that ADCU could send out to its members."

ADCU is an organization of 240 user companies that focuses on data communications.

COS, a user-vendor consortium working to foster implementation of Open Systems Interconnect (OSI) standards, created the affiliate membership category in January to encourage greater participation by users groups and associations. Affiliate members pay a \$500 annual fee — full members pay \$25,000 to \$200,000.

Affiliate members are not allowed to attend COS' bimonthly Strategy Forum sessions, where full members decide policy and strategy issues, and they are also barred from attending meetings of COS' User Committee, which comprises user companies that are full members of the group.

The Network Users Association has recently joined COS as an affiliate member, and the International Communications Association and the Tele-Communications Association have said they are considering affiliate membership in the standards-steering body.

The issue of whether or not to join COS was not decided at the

ADCU meeting, according to ADCU Executive Director August Blegen, who added that a decision would probably be made at a board meeting within a few months.

Blegen praised COS and said he thought users could benefit by joining. "What they are doing is very much a bellwether of what's going to happen in the next few years, and we want to be a part of that," he said.

Blegen said he foresees no problems that would prevent ADCU's board from approving COS membership. "I don't anticipate any serious objections. The only possible objection would be the potential lack of manpower," he said.

Aside from the issue of COS membership, ADCU members at the conference said they are pleased with the organization's work in the areas of regulation and standards, and they appreciate the interaction among users that the group meetings foster.

"ADCU is small enough that members have a real say in setting the group's direction and policy and large enough to have an effective voice in the regulation and standards areas," said Michael Quinn, telecommunications staff consultant at Primerica Corp.

ADCU has a relatively low-key approach to the two areas in which it currently has working committees — public policy and standards. "We're not strident in tooting our horn publicly," admitted ADCU's outgoing president, Michael Kanthal, who is also vice-president at Citibank, N.A. "For example, when we file a petition, it's more of a rifle shot than a shotgun approach," he said.

That low-key bearing is due, at least in part, to the fact that some ADCU members, especially banks, are conservative and might withdraw from a more raucous organization. "We have a certain level of conservatism, and we have to

maintain it," explained Gregory Wright, assistant vice-president at Chemical Bank.

But ADCU is limited by more than members' conservatism; volunteers to staff potential projects

are scarce. Incoming president, Lewis Haring, said he has already come up against that problem in his attempt to raise interest in a new ADCU committee for network planning.

"Unfortunately, groups like ADCU suffer from the fact that users don't have much time to participate," said outgoing ADCU Secretary Anthony Mattera. □

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►CORPORATE RESTRUCTURING

Novell reorganizes to bring its units closer

BY PAULA MUSICH

Senior Editor

PROVO, Utah — Local networking vendor Novell, Inc. announced a reorganization last week, citing the need to draw the vendors it has acquired recently more closely into the parent company.

Two new groups, Worldwide Operations and Novell Sales, Service and Marketing, were formed as part of the restructuring. Former CXI, Inc. President Louis C. Cole was named executive vice-president of the Worldwide Operations unit, which includes micro-to-mainframe link maker CXI, networking components manufacturer Santa Clara Systems, Inc., programming tools developer Softcraft, Inc. and NetWare Centers International (NCI), Novell's distribution and support arm.

The Worldwide Operations group will oversee manufacturing, research and development, and product marketing for all Novell and subsidiary products.

The sales group includes the company's major accounts, reseller sales and NetWare services divisions. Novell Chairman and Chief Executive Officer Raymond J. Noorda will head up the group until the company names an executive to fill the post.

NCI, which previously was part of Novell's sales and marketing operations and supported regional NetWare Centers, will now provide products and training programs for the reseller and major accounts divisions.

"NCI will provide power supplies, network adapters, value-added networking equipment — things that don't need to come from Novell corporate," said Craig Burton, vice-president of marketing and business development.

CXI, which was acquired in March, was recently renamed the Data Communications division. "CXI does NetWare-to-SNA and NetWare-to-anything else connectivity," Burton said. "Their charter is to provide connectivity from

the PC to heterogeneous networking environments and operating systems. They are Novell's connectivity partner."

Separately last week, CXI announced that it will begin selling its PCOX communications hardware products separately from its communications software.

In addition to CXI's own hardware, the software operates with the IBM Advanced Emulator Adapter for the Personal Computer and Personal System/2, as well as Digital Communications Associates, Inc.'s Irma and AST Research, Inc.'s micro-to-mainframe adapters.

The PCOX communications software products support single- and multiple-host sessions, file transfer, host graphics, local-network-to-mainframe gateways, windowing and emulation of host printers.

According to newly appointed CXI President Philip M. Lumish, the unbundling reflects the shifting emphasis from hardware to software in the micro-to-mainframe market.

CXI also said it is offering a site-licensing option for customers, who can now pay a one-time charge for the right to copy and distribute the software to an unlimited number of users at a host site. □

Arizona avoids AT&T fees

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network nodes.

State-owned point-to-point analog microwave systems will be pressed into service where it is more economically attractive than lightwave cable, as a means of hooking remote sites to network nodes, Beauchat noted.

T-1 links will also be used to link the central switch with several other surrounding sites equipped with Northern Telecom, Inc. SL-1 PBXs and a new 800-line PBX to be installed in Tucson, the state's second largest city.

Sixteen T-1s will be installed between the Phoenix hub switch and Tucson.

State offices within the capitol building/mall complex here will be interconnected using leased fiber-optic and coaxial cable facilities. Initially, all PBXs will be directly connected to the T-1 lines.

The Department of Administration issued the request for proposal outlining this network plan in mid-June. Besides the hub switch and 800-line Tucson PBX, the RFP calls for the installation of uniform cabling systems in 40 state-owned buildings.

The RFP was made available to 80 vendors, but only 14 requested the document. Proposals are due the first week of August.

Because of the department's participation in Mountain Bell's Integrated Services Digital Network (ISDN) field trial, those vendors responding to the network RFP must delineate the ISDN capabilities of the PBX pitched.

Beauchat said an RFP for T-1 customer premises equipment will

be released in the fall. Two multiplexers, one at the Tucson node and one at the Flagstaff node, will channel voice traffic from remote sites.

Yet a third RFP, calling for a digital upgrade of the state's analog microwave net, is due out in late 1989.

The Department of Administration began looking to a private network solution when faced with an AT&T tariff change that would have raised private-line rates by 90%. As a user of AT&T's Common Control Switching Arrangement (CCSA) network, an offering that provides switching capabilities on leased lines, the department faced a rate increase of 3% due to a tariff filed on March 25.

Although that is nominal, a spokeswoman for Arizona Corp. Commission's Utilities Division said the filing contained a 90% hike for private-line services, an increase that AT&T had volunteered to phase in over two years.

Beauchat said use of the T-1 net would enable his department to avoid that rate hike and better control costs. "We decided that where it was economically feasible, the state should own and maintain switching systems and transmission facilities," he explained.

The T-1 transmission facilities will be procured under long-term lease.

AT&T, Rolm Corp., US West Information Systems, Centel Business Systems and GTE Corp. head the list of vendors vying for the three-year, multimillion-dollar private network pact.

Beauchat said he expected use of the uniform cabling systems would cut in half the labor portion

of telephone station moves, adds and changes. "Now, we are paying outside technicians about \$50 an hour for this work. We can have members of our own staff perform that same function for \$25 an hour," he said.

Although Beauchat likes the idea of a single company coordinating all aspects of the private net project, he said, "If one vendor wants to handle the entire project, it will have to put pressure on a cabling system subcontractor to make sure we get a good price."

Prior to the distribution of its network RFP, the Department of Administration required all prospective bidders to attend a conference in March. This user-vendor tete-a-tete was designed to familiarize vendors with the department and to familiarize them with the private T-1 net project. Beauchat also required prospective bidders to visit two of the planned T-1 network sites and to return network proposals in only six weeks.

Beauchat and company enlisted the aid of a pair of California-based communications consulting firms in the effort. These firms helped Beauchat determine end-user needs and what private network configuration would best suit the department.

"The consultants have handled all aspects of the project," Beauchat said. "They conducted on-site interviews with end users at every state agency."

The Department of Administration stuck to state guidelines that require projects with a price tag of more than \$5,000 to be awarded via competitive bid. Assistance from the two consulting firms was acquired by bid. □

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► INDUSTRY CONFERENCE

Users air net concerns

Consensus: No one vendor can do it all.

BY MARY PETROSKY

West Coast Correspondent

NAPA, Calif. — Tying personal computers into corporate networks and providing desktop devices with ubiquitous access to network resources are among the most pressing networking issues facing large companies, according to a panel of users at a conference here last week.

The managers who spoke at the Telecommunications Industry Conference, sponsored by Dataquest, Inc., a research and consulting firm, told an audience of vendors and consultants that they are convinced no one vendor is going to solve all of their connectivity problems.

The managers, from Dow Chemical, U.S.A., Hughes Aircraft Co. and DunsNet, Inc., said they are increasingly looking to international communications standards as the solution to integrating a broad range of equipment on their networks.

Despite Dataquest's own assessment that private branch exchanges are, and will continue to be, one of the least popular connectivity solutions, two of the three communications managers on the panel noted that they are using PBXs today to provide data connections. Hughes Aircraft has a PBX-based backbone that supports local networks, said Janey Place, telecommunications manager for Hughes Aircraft's Electro-Optical and Data Systems Group.

Although happy with the system, Place said she is concerned about how bridges between local networks and PBXs will hold up as network traffic increases.

Dow Chemical also uses a combination of PBXs and local networks to handle data connections in its Freeport, Texas, facility, said Michael Hipp, senior communications engineer for the company. One dilemma for Hipp is how to provide the best host connection with the local networks available today.

So-called traditional personal computer networks from vendors such as 3Com Corp. and Novell, Inc. don't provide the sophisticated graphics-based terminal emulation his users need, Hipp said. And host-based networking solutions, such as IBM's Systems Network Architecture, intimidate users by forcing them to use host-type commands.

Hipp said he would like to see a local network that combines the speed and ease of use of today's personal computer local nets with sophisticated ties to host environments. Dow Chemical's strategic direction is to migrate to a single network based on Open Systems Interconnect (OSI) standards. Migrating to OSI will help Dow Chemical achieve its goal of providing user access to any device on the network, Hipp said.

None of the managers see Integrated Services Digital Network as a real connectivity alternative in the short term. "We believe ISDN is coming, but we can't wait," said Allan Conner, president of DunsNet, the communications arm of Dun & Bradstreet Corp.'s subsidiaries.

"We cannot be paralyzed waiting for standards to be defined. We need ISDN functions right now," Conner said. Hipp agreed that ISDN appears to be a good technol-

ogy. However, "we don't see ISDN figuring in our plans for at least five years," he said.

ISDN, as now defined, has little to offer in terms of desktop connectivity, Hipp said. "Sixty-four kilobits to the workstation just isn't going to be enough."

Both Hughes Aircraft and DunsNet rely heavily on their networks as a centralized resource for their decentralized businesses. As a result, both companies strongly favor controlling their own nets.

"We are large enough to want and need control over our own networks," said Hughes Aircraft's Place.

DunsNet's Conner said his staff is also sophisticated enough to handle network management,

which in DunsNet's case includes control of T-1 facilities, modems, a packet-switching network and an SNA network.

"We want to be in the position where we can choose carriers for cost reasons," Conner said, "so we'll be moving in the direction of maximizing control over our network environment, as opposed to depending on carriers to provide those kinds of facilities."

Conner said he would like to see network control systems improve so they can detect and report on subtler problems than are handled today. If better tools are available, Conner said, he believes he will be better able to control his management costs as the DunsNet network increases in complexity. □

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► WORKSTATION NETWORKS

Apollo extends Domain

BY PAULA MUSICH

Senior Editor

BOSTON — Amid a downpour of announcements released here last week, technical workstation vendor Apollo Computer, Inc. extended the capabilities of its Domain networking system to include a direct link for IBM Personal Computers and compatibles.

The communications announcements — part of a larger event that saw the introduction of a new series of workstations — included plans to provide a direct Ethernet connection for IBM Personal Computers under the Domain network umbrella. Also announced was the Domain PC Emulator, which enables Apollo workstations to emulate IBM Personal Computers and use applications written for those microcomputers.

The new products represent Apollo's attempt to provide tighter integration of Personal Computers into the Domain technical workstation environment.

"We're not asking customers to throw away their investment in Personal Computers and PC applications," said Amy Enfield, the Apollo product manager responsible for Personal Computer integra-

tion products. "We're making PC access to the Domain file system transparent."

Earlier this year, Apollo announced it would open up its Domain networking scheme so that it could be implemented on industry-standard Ethernet networks, as well as the company's proprietary 12M bit/sec token-ring network.

The new Domain PCI Ring, scheduled to be available in November, is a single board network adapter that links IBM Personal Computers and compatibles to Apollo's token-ring network.

The software, which supports up to eight Personal Computers, provides translation between Personal Computer file formats and Domain file structures, but the translation is transparent, according to Enfield.

The Domain PCI Ring requires 256K bytes of random-access memory in the Personal Computer, which must run Microsoft Corp.'s MS-DOS 3.1 or above.

The PCI Ring adapter and software are priced at \$1,350 in single quantities, and the workstation server software is priced at \$450. Both the adapter and the server software are discounted for larger quantities. □

GSA's plan may cut fed costs

continued from page 2

geous to all federal users."

By signing one governmentwide service contract with each PDN, the GSA hopes to be able to negotiate prices that are below commercial prices, Aguilar said. When a federal agency needs a data service, it will simply fill out a purchase order with the vendor of its choice.

The GSA estimates that each PDN could earn several million dollars a year through this program. Potential bidders include Tymnet/McDonnell Douglas Network Systems Co., Computer Sciences Corp., AT&T and Telenet Communications Corp., a division of US Sprint Communications Co.

"This type of procurement will allow the federal government to guarantee prices perhaps 10% below commercial rates for the life of the contract," said industry analyst Frank Dzubeck, president of Communications Network Architects, Inc. in Washington, D.C.

Critics of the PDN plan say the proposed Federal Telecommunications System 2000 (FTS 2000) will provide similar packet-switching services to federal users and often will provide more advanced features than the PDNs.

"We looked into this program several months ago and didn't find any conflict with FTS 2000," said Walter Irvin, FTS 2000 project manager at the GSA. "This program is supposed to go into effect

fairly quickly, while FTS packet services will not be widely available for several years."

Once FTS 2000 is available, the PDN service providers are likely to compete with FTS 2000 for users, Irvin and Aguilar agreed.

"The PDN program is designed to begin offering federal users data transmission services by the end of this year. Between now and when FTS 2000 is operational, we expect a steady demand for public packet services," Aguilar said. "In addition, not all federal agencies are going to use FTS 2000. The GSA feels there's room for a complementary service like this."

The PDN program will also compete with private data networks that many federal agencies have in place or are installing.

"In fact," Dzubeck said, "you'll probably find the same vendors bidding in competition with themselves for a PDN contract and a private network contract."

This doesn't seem to bother some of the PDNs that are already supplying both public and private networks to the federal market.

"You might have an agency with a private data network that needs public packet services to reach regional offices with low to medium data-transmission requirements," said Andy Price, federal region manager at Tymnet.

Even though these applications don't individually generate high-traffic volume, there are hundreds of federal offices that need this type of solution. In total, Price said, it adds up to lots of traffic. □

ADCU members discuss course

continued from page 3

officers were elected during the conference. Alan Carlson, communications manager for Ziff-Davis Technical Information Co. in Burlington, Mass., was elected first vice-president; and Pat Ryan, manager for telecommunications networks at Pitney Bowes, Inc. of Stamford, Conn., was elected second vice-president. Richard Miller, supervisor of data communications for Eastman Kodak Co., was elected secretary.

Reflecting on his two-year tenure, Kanthal spoke of his work in helping to develop an electronic bulletin board for ADCU members that was launched at the conference following a successful three-month trial. Operated by Wall Street Data Services, which is owned by the Bank of New York, the bulletin board will allow ADCU members with personal computers to exchange information with other members for \$16 per hour of connect time.

Despite limited nationwide exposure, users still flock to ADCU's annual meeting, hoping to pick up advice and information to help them in their jobs. "If I get just one helpful hint out of this, then it was worth coming here," said Jim Simmons, manager of data communications for Philadelphia-based Reliance Insurance Co.

Bill Harkema, data communica-

tions manager at Michigan National Bank in Lansing, Mich., came to the conference looking for cost-cutting hints. "If I had my druthers, I'd have a point-to-point line from all my users to my host," he said. "But that is too expensive." The ADCU conference, he said, allows him to hear how other users have trimmed costs.

ADCU members heard Nynex Chairman Delbert Staley proclaim that the regional Bell holding company should be freed from regulatory restraints. In his keynote address, Staley claimed that if restrictions were lifted, Nynex would not enter the long-distance market.

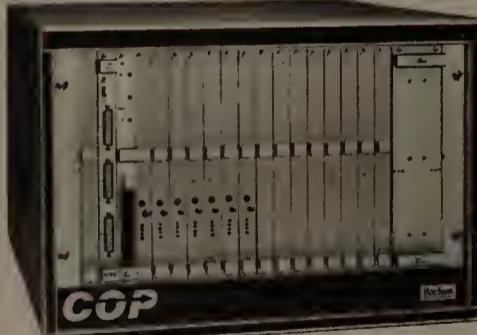
The company would support ONA, which would offer enhanced service providers and end users equal access to a slate of Nynex-provided basic services.

ADCU, however, has submitted comments for the Department of Justice's ongoing triennial review of the Modified Final Judgment that oppose lifting restrictions on enhanced services until ONA is actually implemented.

John Comptello, outspoken chairman of ADCU's Public Policy Committee and vice-president of telecommunications planning at Irving Trust Co. in New York, said, "We get concerned that seven large BOCs, could eat up the four or five large packet switching and other enhanced services providers," he said. "We're enjoying a good level of competition. Why don't we leave it alone?" □



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INDUSTRY UPDATE

► TAKEOVERS

Micom gobble up Spectrum Digital

Fills T-1 hole in communications product line.

BY JOSH GONZE

Staff Writer

SIMI VALLEY, Calif. — In a move aimed at filling a significant gap in its data communications product line, Micom Systems, Inc. last week said it will acquire T-1 multiplexer start-up Spectrum Digital Corp. for \$25 million.

The deal, not yet finalized, will give Micom rights to the T-1 technology Spectrum Digital has developed for its networking multiplexer, the Integrated Services Digital Exchange (ISDX), which can carry voice, data and video transmissions on T-1 links. OEM contracts that Spectrum Digital had signed earlier

with Paradyne Corp. and other vendors will be preserved and even enhanced, according to a Micom spokesman.

Industry analysts said rapidly growing demand for T-1 products created a T-1 hole in Micom's data communications line. Micom currently sells a data private branch exchange, low-end statistical multiplexers, protocol converters, limited-distance modems and an Ethernet local network through Micom-Interlan, Inc.

"Micom is interested in Spectrum Digital for the same reason Digital Communications [Associates,

Inc.] bought Cohesive [Network Corp.], that Codex [Corp.] felt the need to OEM StrataCom, [Inc.'s] T-1 multiplexer and that Paradyne OEMs the Spectrum Digital box," said Steve Levy, communications analyst at the New York investment banking firm Hambrecht & Quist.

"These are broad-based data communications companies that have recognized they need T-1 multiplexing products among their offerings," he said.

Gerald Mayfield, president of professional services at DMW Group, Inc., agreed. "Micom came to the same conclusion Infotron [Systems Corp.] and DCA did," he said. "It's a better financial decision to buy the T-1 technology than to develop it internally."

Infotron once maintained a financial stake in Network Switching Systems, Inc., a T-1 multiplexer maker now owned by BBN Communications Corp.

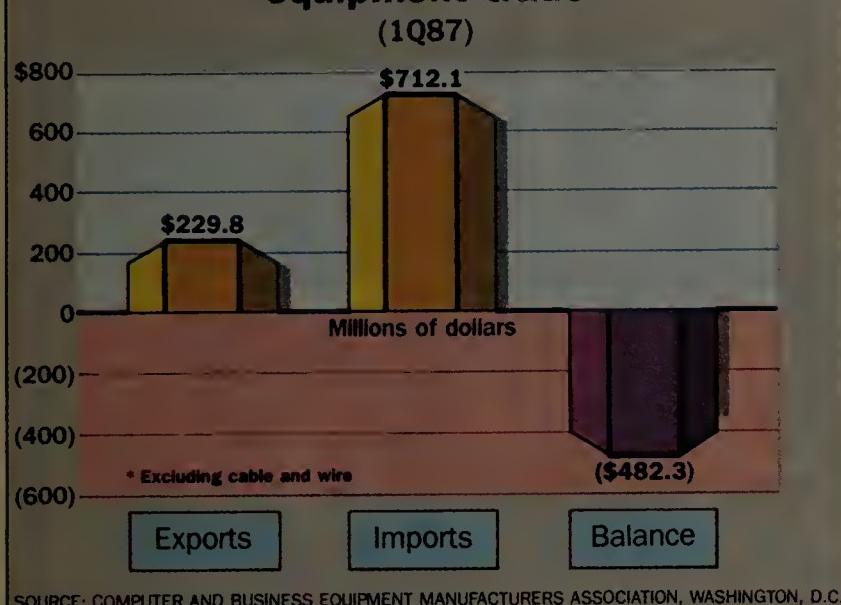
Micom Vice-President of Marketing Chris Kenber said the company will not attempt to compete in the high-capacity T-1 multiplexer marketplace. Instead, he said, it will concentrate on selling the ISDX to the mid-range minicomputer users who make up most of Micom's installed customer base.

"Our purpose is not to go out into the marketplace and compete with a [Network Equipment Technologies, Inc.] or a Timeplex, [Inc.] at the high end. That is simply not our strategy," he said. "We're not structured to do that."

Kenber agreed with analysts who said that, to sell the ISDX successfully, Micom must work through a direct sales force or value-added resellers and not through third-party distributors. "Obviously, you don't buy a product like a Spectrum Digital T-1 mux and stick it in a distributor."

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Telecommunications equipment trade (1Q87)



► INTERNATIONAL MARKETING

AT&T-Philips dealt another setback

BY AMIEL KORNEL

CW Communications International News Service
European bureau

PARIS — AT&T recently suffered another setback in its efforts to penetrate Europe's telecommunications equipment market when AT&T-Philips Telecommunications B.V. (APT), the company's Netherlands-based joint venture with Philips N.V. of the Netherlands, lost a bid for a 55 billion Belgian franc (U.S. \$1.4 billion) contract from Belgium's national telecommunications authority. The five-year contract called for switching and transmission equipment to modernize Belgium's telecommunications network.

In April, APT's hopes of entering the French market were dashed when the French government decided to sell nationalized telecommunications equipment manufacturer Cie. General des Constructions Telephonique, a former ITT holding, to a consortium led by Sweden's L.M. Ericsson.

See page 12

AT&T embarks upon Starlan promotion

AT&T recently launched a program designed to help its authorized dealers and value-added resellers promote AT&T networking products to the small and mid-range business market. Under the plan, various Networking Centers to be developed will feature Starlan demonstrations. This marks another in the series of recent AT&T attempts to boost its share in the data arena. In the past month, the carrier has wooed customers with a 31% price reduction on the PC6300 Starlan Network Access Unit and a \$200 rebate on AT&T personal computers purchased from resellers.

INDUSTRY EYE

MICHAEL DORTCH

Casting a baleful eye on ISDN's advance

This column is in response to a column on Integrated Services Digital Networks ("Future benefits of ISDN appear not so far away," NW, May 11) written by Jerome F. Kemp, senior engineer of advanced development and project manager for NCR Comten, Inc.'s ISDN trial efforts.

The vendor view of Integrated Services Digital Networks is at best aggressively optimistic and at worst misleading to users.

The ability to integrate voice, data and image transmissions on twisted-pair wire will significantly reduce network wiring costs for some users. It should also make network moves and changes simpler and less expensive.

However, users must develop backup strategies for their integrated transmission facilities. The more communications carried over a single facility, the more critical that facility becomes and the more costly to lose. Users will also require more effective

Dortch is a senior telecommunications analyst with The Yankee Group, a Boston-based market research and consulting firm.

network management tools for both voice and data.

Perhaps more important are the political considerations. Voice and data managers have yet to learn to work together in many companies. Competition among MIS, telecommunications and other departments for the role of network manager exacerbates this situation. The Yankee Group feels that these unresolved issues may leave many users unprepared to take full advantage of ISDN products and services for some time after such offerings are introduced.

The May 11 Industry Update column stated that "tariffed [ISDN] service offerings and customer premises equipment are expected to be available" as early as 1988. But the Bell operating companies and the regional Bell holding companies, the expected primary vendors of ISDN services, are still trying to determine what services to offer, how to get them tariffed and how to market them.

Even as BOCs, notably New England Telephone and Southwestern Bell, begin to develop and test potential offerings, doubts about how such offerings

See page 12

DCA stalks Fox Research

continued from page 1

sales, which have slowed of late. They say the firm's strategy is to become a one-stop vendor for communications gear without having to develop a wide range of products in-house.

Since 1983, when the company entered the communications market by acquiring Irma-maker Technical Analysis Corp., DCA has acquired Forte Communications, Inc., a manufacturer of micro-to-mainframe links; Cohesive Network Corp., a T-1 multiplexer maker; and Microstuf, Inc., which sold the popular Crosstalk personal computer communications package.

DCA now sells such products as network processors, statistical multiplexers, T-1 multiplexers, protocol converters, X.25 packet assembler/disas-

semblers, modems and software for network management and control.

Sources at DCA said the company expects to close this fiscal year, ended June 30, with revenue at \$180 million, a \$30 million increase from fiscal 1986. But, said Charles Yarbrough, DCA's finance director, 1987 fourth-quarter revenue decreased between 12% and 15% compared with last year, due to declining sales of Irma boards. Yarbrough said users held off on Irma purchases while evaluating new IBM products.

"Part of our overall corporate strategy is to be in many segments of the communications industry, and we're always out there looking and evaluating," said Clay Scarborough, DCA's director of corporate

strategy. "The companies we've bought have been well-positioned and could fit with our company."

David Garcia, an analyst with New Orleans-based Howard, Weil, Labouisse, Friedrichs, Inc., added, "DCA wants to be a full service data communications house, and rather than try to develop expertise internally, they roll in the expertise, and they do it in a way that is attractive to the smaller company."

Subject to the approval of the shareholders of Fox Technology, Inc., Fox Research's parent company, the acquisition calls for DCA to make a cash payment and assume liabilities totaling \$10 million, according to Yarbrough.

Additional payments of up to \$6.5 million could be made, depending on the financial performance of Fox Research subsequent to the

acquisition, he added. The acquisition is expected to be finalized by August.

With Fox Research, DCA gains the opportunity to penetrate the "entry-level marketplace" for personal computer local networks, said Bill Hiller, DCA's director of communications. "We saw an opportunity in the entry-level marketplace for PC LANs," Hiller said. "We said, 'Here's this huge market, let's go get it.'"

According to DCA's Scarborough, "We needed something with good performance but relatively inexpensive and easy to install. We thought Fox was an opportunity that would fit with some of our current businesses."

DCA was also impressed with Fox's financial performance in the market, especially in Europe where the company has met with a good deal of success. Fox's sales in 1986 were \$6.7 mil-

lion, compared with \$26,000 in 1983 when the company was founded.

Greg Goodall, president of Fox Research, said DCA will boost his company's marketing power.

"It gives us the missing ingredient we've needed to make our network product one of the best-selling LANs in the market," he said. "We've had various opportunities over the past few years to be acquired from both an investment standpoint and from outside sources. But for various reasons, we didn't pursue those opportunities, or we decided it wasn't in the best interests of all concerned." Goodall would not disclose the names of the companies that attempted to acquire Fox Research.

Analysts agreed that credibility and exposure are the main benefits Fox hopes to gain from DCA's backing.

Greene grills Justice

continued from page 1

nifications users and vendors, and state regulators testified as to whether changes in the industry warrant removal of these line-of-business restrictions. The hearing was the last step in the triennial review of the Modified Final Judgment, which have governed the RBHCs since 1982. Greene will review this oral and written testimony before issuing his decision on changes to the rules this fall.

During oral testimony,

Greene struggled to understand why the Justice Department wants to lift the very line-of-business restrictions it created in 1982 under the AT&T antitrust settlement.

The Department of Justice said widespread competition in telecommunications markets and Federal Communications Commission rules would prevent the RBHCs from abusing their monopoly power if allowed into the restricted markets.

Greene's unrelenting questioning of Justice Department attorneys, Nancy Garrison, deputy chief of

the Antitrust Division, and Barry Grossman, communications section chief, might bode poorly for the Baby Bells, who argued they must be allowed to diversify into new markets in order to thrive.

In his opening remarks, Greene stressed that he would decide the case purely on antitrust issues. "The court will not be swayed by political or economic power or by public relations campaigns," Greene said. "The MFJ restrictions were not designed as a permanent solution, but they will not be removed for cosmetic reasons."

During the first day of testimony on letting the RBHCs offer long-distance services, Garrison argued that the court should consider the issue on a case-by-case basis.

"I sat here for 11 months in 1982 listening to the Justice Department argue the exact opposite of what you're saying today," Greene said. "Was that a different Justice Department back then? What has changed so dramatically in the telecommunications industry to bring about such a change of attitude?"

Garrison argued that the consent decree has achieved its objective of opening markets and increasing competition. Changes in technology and regulation should prevent RBHC monopoly abuses and, thus, justify removal of the restrictions, she said.

Greene asked if consumer protection should be considered. Garrison said consumer interests are best

served by regulators such as the FCC.

"I heard the Department of Justice argue four years ago that the court should listen to consumer interests. Now you're saying consumer interests have no place in antitrust law," Greene said.

MCI Communications Corp. attorney Chester Kamin, speaking on behalf of interexchange carriers, said the RBHCs could disadvantage companies like MCI if allowed into the long-distance market because of their control over the local exchange monopoly.

"When a company has monopoly control, human nature can't resist the temptation to use that control to gain unfair advantage," Kamin said.

"Nothing has changed since divestiture. The RBHCs still have their hands around the neck of interexchange carriers. The question is, do they have the incentive to squeeze?" Kamin added.

The Department of Justice, for the first time, came out against RBHC entry into the international long-distance market. Such a recommendation could hurt Nynex Corp., which paid \$10 million for an option to purchase a 50% stake in the Private Transatlantic Transmission System (PTAT), a venture to construct an undersea fiber-optic cable between the U.S. and UK.

On the second day of hearings, during arguments on equipment manufacturing restrictions, Greene appeared even more critical

of the Justice Department.

The Department of Justice's Grossman said there is sufficient competition in the telecommunications equipment market to prevent the RBHCs from gaining unfair advantage if allowed to manufacture such gear as central office switches and telephones. Existing FCC rules will also help to prevent such abuses, he said.

Greene's response was one of astonishment. "How can you say those FCC rules are effective in detecting anticompetitive abuses. These are the same FCC rules you stood before me denigrating in 1982. I'm told the FCC now has fewer people to police abuses, so I don't understand how these rules will be more effective than they were in 1982."

Margery Baker of the New York Public Utility Council said there are no FCC rules regarding equipment manufacturing, and "the states are not satisfied that the FCC will be able to deal with RBHCs' manufacturing issues."

On the final day, the court heard arguments on the information services restrictions.

Greene said, "If the RBHCs are allowed to provide information services such as voice messaging and videotext, it could be of great benefit to the public."

"It could also pose great competitive harm to competitors who might be squeezed out by the RBHCs. What would you do if both interests couldn't be accommodated?"

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NETWORK WORLD

An IDG Communications Publication

Casting a baleful eye on ISDN

continued from page 7

will be regulated, packaged, priced and marketed still abound and could delay the proliferation of ISDN considerably.

Most large businesses need uniform access to communications services across geographic boundaries. Despite this, the BOCs and RBHCs appear to vary sharply in their commitment to support Open Network Architecture (ONA). ONA is necessary if the BOCs and other information service providers are going to provide the universal service availability users need.

In addition, prospective vendors of ISDN customer premises equipment are still trying to decide what to develop, build and market.

ISDN customer premises equipment will require extensive testing to prove both conformance to ISDN standards and interoperability with other vendors' products. The Yankee Group, therefore, expects no significant market penetration by ISDN customer premises equipment until at least 1991 or 1992.

Should all the above issues be resolved, users would still be waiting for demonstrable ISDN applications that are meaningful to them. The May 11 column states that

ISDN will give users a common "transport mechanism for all communications." The Yankee Group's user clients are not interested in "communications transport mechanisms," but in applications.

Enhancements to telemarketing and pay-per-view cable television are interesting but do not constitute the market-changing effects users are expecting from ISDN. The time required to discover, develop, test and market applications is curiously absent from the column's discussion of "integrated access" and the use of the D channel for out-of-band signaling.

An enhancement to Centrex

The Yankee Group sees ISDN primarily as an enhancement to Centrex services for at least the next two to three years. (All the "leading-edge" ISDN users are also large Centrex customers.)

Users would do well to temper vendor enthusiasm with careful understanding of their own needs and of all the forces at work in the tumultuous network market.

Interested *Network World* readers can receive an Executive Summary from The Yankee Group's latest ISDN report at no charge. Please contact Michael Dortch at (415) 387-1520, and leave your complete mailing address. □

AT&T-Philips dealt setback

continued from page 7

Yet, as recently as three weeks ago, the picture was looking rosier for APT. On June 16, it entered the Spanish market by acquiring the civil telecommunications operations of Marconi Espana SA.

APT also told the press it had received "unofficial" word that it had won the lion's share of the Belgian contract. APT officials disclosed in April that they expected the firm, created in 1983, to break even in the next fiscal year.

But Belgium's Regie des Telephones et Telegraphes (RTT) announced two weeks ago that the deal would go to local subsidiaries of French and West German companies: Bell Telephone Manufacturing Co. N.V., the ex-ITT affiliate acquired this year by Cie. General d'Electricite (CGE); and Atea, bought last year by Siemens AG from U.S.-based GTE Corp.

Now, more than three years after its creation, APT has little more to show for its efforts than orders in Spain and the Netherlands. Further, the Spanish acquisition could turn into a mixed blessing, analysts warn, because of the troubled financial situation at the ailing Spanish company.

The Spanish deal calls for APT to take control of the civil telecommunications business of Marconi, one of two ITT affiliates acquired by Netherlands-based Alcatel N.V., the CGE-controlled telecommuni-

tions group created earlier this year. The restructured firm, owned jointly with Amper SA of Spain, will absorb 450 of Marconi's 1,250 employees. The new owners plan to invest \$30 million in the firm, which is to be operational by year's end.

Initial revenues, coming from orders promised by Spain's state-controlled telecommunications authority, Telefonica, are expected to be about 4 billion pesetas (U.S. \$31.5 million). Telefonica's orders are expected to rise to 8 billion pesetas after five years.

The Spanish public telecommunications network, with 9.7 million access lines installed by 1985, is the fifth largest in Europe, after West Germany, France, Britain, and Italy, according to Arthur D. Little, Inc. The

Cambridge, Mass.-based market research firm estimates the Spanish market is growing faster than its European neighbors, at an average yearly rate of 8.8% between 1985 and 1990.

But observers warn that Marconi's financial health is far from assured. They note that Telefonica is a sleeping partner in the other Spanish Alcatel affiliate, Standard Electrica, owning 25% of the firm's capital.

In fiscal 1985, APT recorded posttax losses of 92 million florins (U.S. \$45 million) on sales of 681 million florins (U.S. \$333 million). Published reports state the firm will post reduced losses on an 11% sales increase for fiscal 1986. □

TELECOM TRENDS

Bakkers hold place in telecom history

Controversial personalities Jim and Tammy Bakker made telecommunications history in 1982 as a result of the Federal Communications Commission's Heritage Village Church decision. Heritage Park, a theme park and broadcasting facility, straddles the North Carolina/South Carolina state line.

The FCC ruled that Southern Bell Telephone and Telegraph Co., the carrier that served the North Carolina side of the park, could also provide service to the South Carolina side, which is otherwise served by Fort Mill Telephone Co. The FCC ruled that the point of delivery, not the point of use, was the key issue.

ELECTRONIC TANDEM NETWORKS

ETN-ISDN marriage may lower costs

AT&T considers aspects of pairing technologies.

BY JOHN DIX

Assistant Managing Editor

The methodical implementation of Integrated Services Digital Networks is giving rise to new private network capabilities. Although still considering the conceptual aspects, some of the top ISDN thinkers at AT&T are toying with the idea of employing the technology in Electronic Tandem Network (ETN) environments to reduce local access costs.

"AT&T is playing with the notion of getting ETNs to operate with smart [ISDN] nodes in the network so we can do an interesting thing called tandem access avoidance," according to Richard L. Snowden, director of the concept development center for AT&T's Business Markets Group.

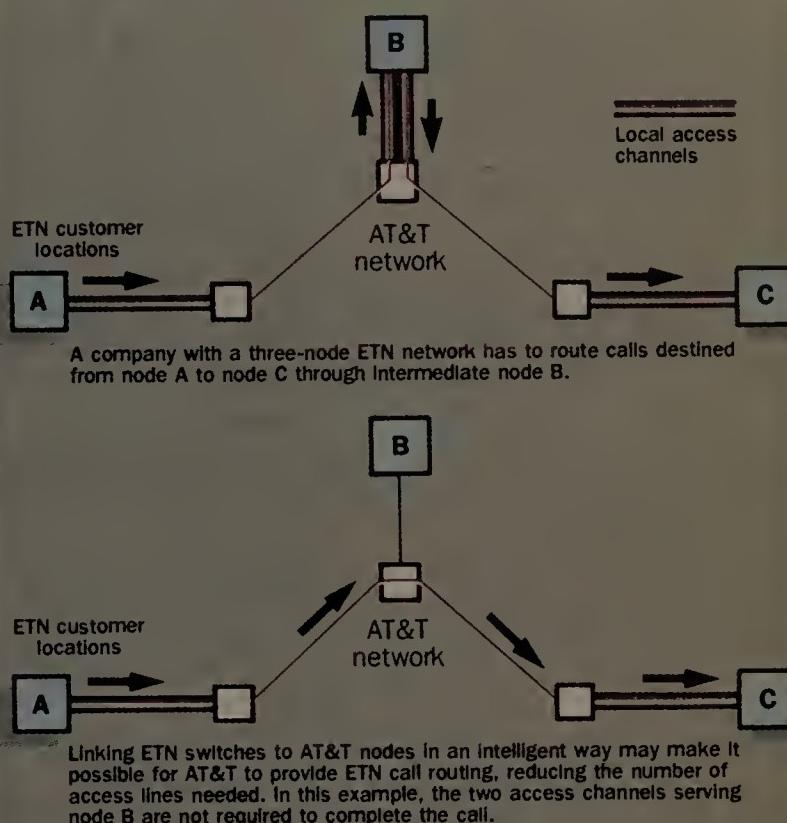
By linking ETN switches to intelligent AT&T nodes, AT&T may be able to provide call routing — off-loading this responsibility from intermediate ETN nodes that normally provide this traffic cop function — and reduce the number of access lines needed.

Snowden said AT&T has studied several customer networks and found that this type of ETN environment could reduce the need for and cost of local access trunks by 50% to 70%.

For example, when an employee of a company with a three-node ETN network (A, B and C) wants to call from Location A to a colleague served by ETN Switch C, the call has to tandem through Node B (see graphic).

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Slashing access costs with future ETN capabilities



ETN = Electronic Tandem Network

SOURCE: AT&T, BASKING RIDGE, N.J.

CROSS TALK BOB WALLACE

PBX vendor throng crowds low-end market

More than a half-dozen private branch exchange vendors have taken steps in the past six months to expand their customer base in the low-end PBX and key telephone segments of the market.

PBX makers have been looking to low-end switch sales to compensate for sluggish sales of high-end equipment. But the low range is about as crowded as a subway car at rush hour, and you can't help but wonder how every switch maker targeting the under 100-line segment will be able to capture market share.

AT&T, Northern Telecom, Inc., Mitel Corp. and Fujitsu Business Communications are among the major players that have recently introduced low-end PBXs designed to extend digital switching to users in the under 100-line market.

AT&T introduced the System 75 XE, which is capable of handling 40 to 600 lines. Northern Telecom announced the SL-1 ST, designed for users with as few as 32 or as many as 400 lines.

Mitel premiered the SX-50,

targeted at the under 100-line user, and Fujitsu announced the Focus 196, which will address the needs of users with 50 to 150 lines.

Both AT&T and Northern Telecom have announced incentive programs in addition to new products.

Others, including Mitel and Siemens Communications Systems, Inc., have reworked their distribution systems. Still others, such as Fujitsu, have only announced products designed to fill holes in their digital PBX equipment lines.

Fujitsu plans to unveil a digital replacement of its analog Focus 100 that it hopes will fare well in the 40- to 60-line PBX market.

Most PBX vendors are introducing feature-rich low-end PBXs as a means of catching the eye of the small business-type buyer. Fujitsu's Focus 196 PBX, for example, comes standard with an Automatic Call Distribution system and Station Message Detail Recording.

A trio of vendors have targeted the hotel/motel industry

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FOREIGN MARKETPLACE

IBM unit to build, sell Rolm gear in Europe

UK-based group will modify switches.

BY AMIEL KORNEL

CW Communications International News Service
European bureau

PARIS — In a move designed to help IBM hawk its telecommunications wares in Europe, the U.S. firm recently announced the creation of a unit to develop and manufacture voice and data switching systems adapted to the European market.

Called Integrated Services Switching Systems (ISSS), the new organization will be based in Britain at IBM UK's Havant facility, according to the company. ISSS will be headed by Frank Onians, currently a vice-president of the IBM-owned Rolm Corp.

"ISSS will concern the Europeanization of products from Rolm," explained a spokesman for IBM Europe in Paris, who added that no Rolm switching systems have been sold in Europe until now.

Approval from the government-controlled telecommunications authorities is a prerequisite to connecting equipment to the public networks in Europe. The ISSS will implement the necessary design changes of telecommunications equipment manufactured in the U.S. so that they meet European

requirements, the spokesman said.

"This move will enable IBM to focus its telecommunications development and manufacturing resources more effectively on the European marketplace," according to Michael Armstrong, president director general of IBM Europe.

Motive for IBM reorganization

IBM indicated last September that a reorganization of its European operations was partly motivated by a desire to improve its European telecommunications business.

IBM already sells its 1750 model analog private branch exchange in five European countries, while Rolm provides UK users with its Automatic Call Distributor system for distributing a high volume of incoming calls to operators or agents, for applications such as airline reservations.

Observers noted that the ISSS emphasis on developing products integrating voice and data that can be connected to Europe's public networks will permit IBM to target the future market here for ISDNs. ISDN is being championed by several European telecommunications authorities. Major pilot projects are under way in France and West Germany.

Strong crowds market

continued from page 13

as another source of low-end PBX revenues. Northern Telecom, Mitel and Fujitsu all offer either custom features or different versions of their small switches.

Other vendors have opted to modify or create new PBX distribution channels as a means of boosting

their low-end user bases. Siemens Communications Systems, for example, purchased Tel-Plus Communications, Inc., the industry's largest independent PBX distributor, in a move that will likely help sell its up to 200-line Saturn II PBX. Mitel opted to create a dealer network to augment exist-

ing PBX distribution channels.

But despite the frenzied activity in the low-end PBX market, can second-tier and marginal players hope to survive, let alone turn a profit? The clear favorites are those who already have a healthy user base, a solid product line and distribution channels that do not overlap or duplicate efforts. □

Marriage may lower costs

continued from page 13

In this scenario, the call uses four local access channels: one to link Location A to the carrier network; a second to establish the call out to intermediate Node B, which routes it through a third channel back to the carrier network; and a fourth access channel to

complete the call to Node C.

Enabling Switch A to interact with and pass on routing information to the carrier switch serving ETN Node B reduces the number of local access channels used for the completion of this call by 50%. One channel is required to access the carrier network, and a second is used to complete the connection to the remote location.

Obviously, customers could not completely sever the local access links serving intermediate nodes, but they could reconfigure ETN networks to weed out access trunks used to accommodate pass-through traffic.

Although there may be other software and hardware requirements making all of this possible, at the very least, the carrier service and customer premises equipment would have to support ISDN signaling as spelled out in the Consultative Committee on International Telephony and Telegraphy interface specifications.

The two CCITT interface standards — the Primary and Basic Rate interfaces — both provide for signaling performed over the D channel to be used to set up voice or data calls over the B channels.

The Primary Rate interface, intended for business use, segments a 1.54M bit/sec digital T-1 facility into 23 64K bit/sec B channels and a 24th 64K bit/sec D signaling channel. The Basic Rate interface, for smaller businesses and residential users, enables a single line to carry two B channels and a 16K bit/sec D channel.

"The idea is to link customer nodes to service nodes, which are already interconnected, and to provide an ISDN D-channel signaling capability so that if a call shows up on this service node and is destined for that switch, we simply route it there under control of the D channel," Snowden said.

Because access channels represent what Snowden calls a "very important and costly part of network connections," savings realized from this type of configuration would be significant.

Another benefit that could be realized by using ETNs in an ISDN environment is the ability to dynamically change the routing tables in any given ETN node on a real-time basis, Snowden said. This would enable a network manager to establish a path around congestion between two network points. □

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In recent months, ads for networking software have all begun to sound alike. Each promises a unique solution to your networking problem (even before the vendor knows what that problem really is). Each tells you the product is easy to use (that is, of course, if everyone is thoroughly trained). And that when you buy the product, you'll get all the technical support you'll need (but they don't tell you how long you must wait to get it).

No wonder user skepticism grows daily!

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LOCAL NETWORKING

► INTERVIEW

Travelers VP talks strategy

Travers Waltrip: 'The local network is the glue that holds it all together.'

BY PAULA MUSICH

Senior Editor

The Travelers Corp., a \$16 billion insurance, financial and health services firm, prides itself on using leading edge information technology to help its professionals work more effectively.

Travers Waltrip, the firm's outspoken vice-president in the telecommunications division, is responsible for the company's two-tier workstation and host network architecture, which is based on IBM's Token-Ring Network. Travelers is currently using more than 50 IBM Token-Ring Networks to link approximately 400 workstations.

Network World talked with Waltrip at the recent LocalNet East conference in New York about the role of local networks in Fortune 1,000 companies.

How are local networks viewed by top management in Fortune 1,000 companies?

The real question should be, 'Does top management see leading edge information technology as a strategic issue?' That happens to be the case at Travelers. Technology, including the host, software on the host, terminals — intelligent workstations in our case — as well as local- and wide-area networks, is absolutely one of our strategic issues.

But top management doesn't really think about local-area networks. They leave the technologists in the company to recognize this issue and to bring the technology into the company.

Under that scenario, the local-area networks at Travelers are a strategic direction, because within Travelers, we feel that bringing this information technology to the

"In trying to develop a market advantage over Novell, [Inc.], 3Com [Corp.] sees its relationship with Microsoft [Corp.] as being very fundamental. But, in their strategic alliance, I don't think 3Com and Microsoft are properly estimating the power Novell has in the market. They just can't kill NetWare the way CP/M died out. In some ways, Novell has a better relationship with IBM than Microsoft does."

Robert Clark

Vice-president

Consulting division

The Seybold Group, Inc.



Travers Waltrip

workplace is the most productive thing we can do for our people. Our
See page 16

LANMARKS
PAULA MUSICH

The local net loop

What's wrong with this picture? If local networking is such a hot topic, why isn't there a major trade show for local networks? New York's LocalNet East, which recently debuted as a second show of the original LocalNet, suffered poor attendance.

Novell, Inc.'s own NetWorld show, held last year in Dallas, drew more of a crowd than LocalNet. In fact, Novell's show did so well, they turned the management of the show over to the group that does PC Expo, and it is planning a repeat show in Dallas for this year.

But seriously folks. This time around, Microsoft Corp. is serious about local networking. Its first stab at writing networking software, MS-Net, wasn't the most effective program for moving information or sharing peripherals in local networks. IBM used only a portion of MS-Net protocols in the PC Network program, its network operating system, and even vendors that pride themselves on compatibility with the MS-Net

"standard" had to write their own file systems to manage information sharing.

This time, however, even if IBM doesn't use the Operating System/2 version of MS-Net, dubbed The LAN Manager, it should be a much better network operating system. Sources close to Microsoft say there's a whole wing of developers in a Microsoft building devoted to the LAN Manager project. That, according to the source, isn't done for just any old project. 3Com Corp. is helping Microsoft with the development of the LAN Manager.

People are talking. In the rumors department, sources close to Sytek, Inc. say that the baseband Ethernet product line the company is readying will actually be supplied by an OEM. Also, General Instrument Corp. says it has been speaking with some organizations about buying its 57% stake in Sytek, but no deals are imminent. Companies rumored to be talking with General Instrument include cash-rich Digital Communica-

tions Associates, Inc., Ing. C. Olivetti & Co., S.p.A. and Nixdorf Computer Corp.

Commodities networking. It seems technical workstations are becoming a commodity item, and International Data Corp. analyst Vicki Brown maintains that the vendors are using local networking to provide added value. This competition may yield some interesting advances in local networking technology, or at least some interesting bedfellows. Expect it to be a sizzling summer for Sun Microsystems, Inc., Apollo Computers, Inc. and other technical workstation vendors, Brown says.

License to network. Boxborough, Mass.-based Micom-Interlan, Inc. was recently granted a license by Digital Equipment Corp. to develop a front-end Ethernet protocol processor for DEC's closed VAXBI bus architecture. The adapter, intended for end users, will perform Transmission Control Protocol/Internet Protocol processing, rather than the VAX host. □

► ACQUISITIONS

Excelan gobble up Kinetics

Move will increase Mac connectivity.

BY PAULA MUSICH

Senior Editor

SAN JOSE, Calif. — Local network vendor Excelan, Inc. agreed to acquire Kinetics, Inc. last week in a stock swap valued at between \$7 million and \$8 million.

The merger is expected to combine Excelan's experience with Transmission Control Protocol/Internet Protocol-based heterogeneous networking products with Kinetics' products for networking Apple Computer, Inc. processors.

Both vendors offer Ethernet networking products. Excelan provides TCP/IP networking software on top of Ethernet for Unix-based machines, Digital Equipment Corp.'s VAX and PDP processors as well as IBM Personal Computers and compatibles. Kinetics provides Ethernet and Appletalk networking products for Apple's Macintosh family.

"Our charter in the world has been to bring networking to dissimilar computers," said Excelan's Jim Tolonen, vice-president of finance. "This is a natural fit for us to add one more family of computers into a common interoperating net."

Kinetics' marketing manager Steve Nelson also sees a complementary fit for the two companies' product lines. "We've primarily done networking for the Macintosh; they have the networking for other environments," he said. "Bringing the two together really completes the picture."

Besides making it possible for processors currently supported by the companies to share the same network media, Kinetics and Excelan plan to provide data-sharing capabilities.

"This will allow people who use TCP/IP and Ethernet to use the same physical media to interconnect their Apple computers, to use their existing computers as file servers for Macintoshes, to transfer data between the machines and ultimately to incorporate the TCP/IP protocols on the Mac side, as well as to incorporate the Appletalk protocols on the dissimilar computers," Tolonen said.

Analysts praised the acquisition but questioned the demand for the

See page 16

Travelers VP talks strategy

continued from page 15

percentage of professionals, as opposed to clerical [workers], is increasing dramatically because we are a company of knowledge people.

[The employees] take information; they think about it, and they create financial instruments that we sell.

Once you decide that productivity results from giving professionals intelligent workstations, then the natural fallout is a local-area network to interconnect these intelligent workstations to the host. The local network is the glue that holds it all together.

Wouldn't it be just as natural to connect intelligent workstations to hosts using microcomputer-to-mainframe links?

Once you put the technology in, the second issue is, 'Can I manage the technology?' If you can't do that, you're lost. The local network gives us the ability to manage the

walked away from the significant management technology of the Token-Ring.

It's really built right into the architecture of the Token-Ring. We can manage better with that architecture. We've always been able to manage the wide-area network, but this is the first opportunity

The local network gives us the ability to manage the technology on a minute-by-minute basis.

technology on a minute-by-minute basis. If we had chosen to use emulator boards into [IBM 3174 terminal controllers], or if we had chosen to use a micro or mini as an interface, we would have basically

we've had, because of this architecture, to truly manage the technology inside of the building.

The other issue is performance. In our testing, we're absolutely convinced that the performance of

the local network is better than using the emulator boards. We're also convinced that using the network brings us better performance than using a micro or mini. So we have two advantages: We've improved performance, and we're now able to manage. That's what's driving us to local-area networks.

What kinds of management issues are you dealing with?

When you manage a network, the first order of business is to maintain the availability of the network, keeping it up and being able to recognize where there is a problem. It also means that we have to be proactive. That's the statistical side of managing a network: Being able to measure what it is doing, to measure errors, and being able to correct potential problems that we see by gathering statistical side of managing a network: being able to measure what it is doing, to measure errors, and being able to correct potential happen, and the other is the proactive side, gathering information and changing the network before something dies on us.

There have been some criticisms of the network management capabilities of IBM's Token-Ring. Are you finding it lacking in those capabilities?

Version 1 was lacking, but Version 2, announced on April 2, provides a significant increase in the monitoring capability of the network manager. You can read into the April 2 release and recognize that it's a part of the overall NetView strategy. Version 2 enhances our capability greatly and, clearly, there will be a Version 3, which is going to be a part of NetView. If it doesn't do it today, hang on. It's going to do it tomorrow. That's our approach to it. □

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Excelan gobble up Kinetics

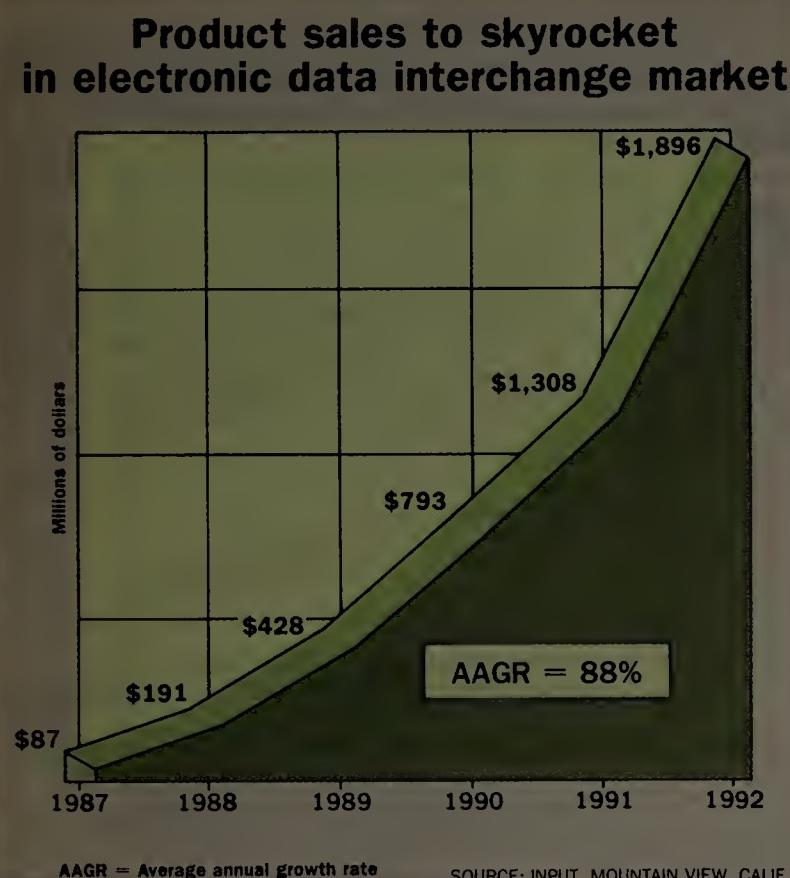
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integration of Apple's Macintosh into larger systems' environments. "TCP/IP is clearly the way to integrate multivendor equipment right now, and bringing the Macintosh in is yet another sound move for Excelan to strengthen its base," said Doug Gold, senior analyst at International Data Corp. "I don't hear that much about demand for Mac connectivity, but it is a perceived demand for the future."

Excelan acquired Kinetics for 450,000 shares of its stock. Excelan, founded in 1982, employs about 250 people; and Kinetics, formed in 1985, has 32 employees. The acquisition is expected to be consummated in 60 days.

Excelan also announced a new line of high-performance Ethernet adapters. The 300 Series adapters use Intel Corp.'s 80286 microprocessor and support Excelan's TCP/IP networking software. The adapters are intended for Intel Multibus-based computers, Motorola, Inc. VMEbus-based processors, DEC Unibus and IBM Personal Computer-bus-based computers. □

DATA DELIVERY / NET MANAGEMENT



► NET ARCHITECTURES

DEC meeting accents distributed networks

Firm talks strategy, but quiet on new products.

BY JOSH GONZE
Staff Writer

GLEN COVE, N.Y. — In a briefing for members of the press and consultants, top Digital Equipment Corp. officials reiterated the basics of the company's networking strategy but released little hard information about new product directions.

During the recent two-day meeting here, attended by about 100 people, DEC managers sounded the theme that the company's distributed approach to networking is functionally superior to IBM's host-based, hierarchical networking architecture — an architecture that has moved closer to

true peer-to-peer communications with the advent of significant new IBM products.

But in keeping with the theme of the briefing, "DEC has it now," officials emphasized that many of the advanced capabilities IBM will deliver next year are already supported by existing DEC products.

DEC made it clear that it intends to preserve and build upon the VAX architecture and VMS operating system and that DECnet networking software will continue to serve as the linchpin of communications in DEC environments for the foreseeable future.

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► NETWORKING TOOLS

Orion adds new SNA software

BERKELEY, Calif. — The Orion Group, Inc. announced software last week that enables a user to conduct multiple IBM Systems Network Architecture logical unit sessions over a single communications link.

The company's sna0123 Facility supports terminal-to-host communications over SNA nets and supports devices emulating IBM 3270 series or 3770 terminals and peripherals.

It also supports IBM 4700 and 3650 financial systems. The sna0123 Facility, which will be available in September, can reside in a processor's internal memory with Orion's implementation of IBM's LU 6.2 software.

The Orion product enables a user to conduct LU 0, LU 1, LU 2, LU 3 or LU 6.2 sessions simultaneously over one communications link. The software provides Synchronous Data Link Control and physical unit session facilities to support various types of sessions.

Orion sells its software directly to computer vendors, and its customers include Apple Computer, Inc., AT&T, Prime Computer, Inc., Ing. C. Olivetti & Co. S.p.A. and Philips International B.V. Philips was instrumental in developing sna0123, which was coded in the C language so it can be easily ported to a variety of processors.

For the past few years, critics and competitors have poked fun at IBM's confusing and unwieldy communications product line. A prime beneficiary of the barbs was Digital Equipment Corp., which was said by analysts to have a cohesive product line, including products that could be attached more easily to Systems Network Architecture networks than some IBM offerings.

The barrage of communications products IBM released last month culminated a dramatic restructuring of the company's communications line that began in May 1986 with the introduction of NetView and the IBM 3720 remote front-end processor. The revamping should quiet critics and send competitors back to the laboratory in search of flaws in IBM's strategy.

There are still holes in Big Blue's product line. Because of its limited horsepower, the company's 3725 front-end processor often becomes a major bottleneck in many large customer networks.

NetView is easier to use than previous IBM network management products, but it is still not simple to operate. Additional network management tools will be needed to monitor and control the peer-to-peer networks many customers will be imple-

DATA DIALOGUE

BY PAUL KORZENIOWSKI

Tides shifting in IBM, DEC war

menting.

Recently, communications managers at many large companies reported a shift in IBM's thinking. In the past, they said, IBM officials did not seem overly concerned with communications issues. Now, not only are those officials concerned about the issues facing users, but they are aggressively moving to resolve many of them.

IBM has enhanced SNA so it can function as a hierarchical or a peer-to-peer networking scheme. The company now offers a line of private branch exchanges to handle voice communications and is trying to weave voice capabilities into SNA. IBM has moved decisively to establish a de facto network management standard with NetView. The company has also outlined a model, Systems Application Architecture, to help users and vendors write software that will run across IBM's complete processor line.

Since IBM appears to be getting its house in order, industry attention may shift to DEC, which of late has been much less active in the communications area than IBM.

DEC's insistence on supporting only one networking topology, Ethernet, is shortsighted. Ethernet is suitable for some applications and not for others.

DEC President Ken Olsen's criticism of the Manufacturing Automation Protocol movement and his company's move to market non-MAP products may backfire. No one said the migration to MAP would be easy, and vendors should not construe implementation delays as a lack of user support.

Also, DEC seems to be lagging behind competitors such as Wang Laboratories, Inc. and Data General Corp. in implementing IBM's peer-to-peer networking schemes. DEC officials say that LU 6.2 is not a de facto standard, despite the fact that many of the nation's largest customers are spending vast sums of research and development money on LU 6.2 applications.

While other vendors stepped up to address the issue of voice and data integration, DEC seems to be burying its head in the sand.

DEC has no private branch exchange in its product line, its products cannot easily support a T-1 multiplexer, and the company offers few tools to manage voice networks.

Network management is another area where DEC is taking a back seat to IBM. NetView has emerged as a de facto standard, but few non-DEC custom-

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"An oxymoron is a commonly used compound phrase that is in direct opposition to itself, for example, "accounting principles," "legal ethics," and "negative growth." Many users believe that "network management" is another example of an oxymoron.

Tim Smith
Senior product manager
Timeplex, Inc.
Woodcliff Lake, N.J.

Tides shifting

continued from page 17

ers even know the name of the company's network management products.

DEC officials talk of supporting the International Standards Organization's Open Systems Interconnect (OSI) network management standards. Those standards appear to be at least a few years away from implementation, though.

When they do emerge, IBM will already be well on its way to linking NetView to most network management products on its customers' networks.

IBM's introduction of the 9370 has also turned up the flame on DEC's VAX line. IBM customers

have welcomed the 9370 with open arms, and analysts report that approximately 50,000 of the devices will be sold during the next few years.

Recent software announcements supplied the IBM processor with X.25, IBM Token-Ring, Ethernet and IBM 3270 connectivity, so the 9370 may one day be the most flexible departmental system on the market.

Much of DEC's recent success stemmed from IBM's inability to supply its customers with cohesive networking solutions.

IBM has begun to address that problem aggressively. Currently, DEC appears to be lagging behind a smitten competitor that is quickly moving to reclaim its turf. □

DEC meeting

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Company officials stressed their intention to preserve all the basic components of DEC's networking strategy, including peer-to-peer communications through Digital Network Architecture (DNA), use of Ethernet at the local level and implementation of Open Systems Interconnect (OSI) standards in DEC products.

Though officials outlined the company's views in such areas as user needs, architectural and product strategy, network management, applications integration and the future of computing, they did not use the meeting to reveal specific product plans.

"It didn't get as specific as I would have liked," said attendee Bob Randolph, who is director of the DEC Advisory Board at International Data Corp., a Framingham, Mass.-based market research company.

DEC managers did say that the company will shy away from IBM-driven, de facto communications standards in favor of OSI compliance.

Dave Korf, wide-area and systems marketing manager for distributed systems, said DECnet will be modified to retain compliance with OSI as its higher-level definitions are finalized.

"DECnet will be able to communicate with an OSI environment — OSI meaning multivendor," Korf said. "That does not mean we'll throw all of DECnet away. We'll continue to enhance and build upon what already exists. But it will evolve to the multivendor OSI standards."

Korf said the company will shun LU 6.2, IBM's proposal for program-to-program communications. "LU 6.2 is not a de facto standard," he said.

Customer demand is for "enterprisewide distribution and sharing of information," preservation of existing investments, a productive environment for homegrown applications, integration of multiple applications and partnerships with other companies to develop new application software, according to John Holz, manager of engineering strategy and architecture.

Predictably, officials dwelled upon distributed network management capabilities. William Johnson, vice-president for distributed systems engineering, said DECnet already has functions akin to those of IBM's NetView. But none of the DEC officials present at the meeting verified rumors that the company plans a NetView competitor.

It was implied but never stated that DEC will supply a NetView interface for DECnet. "In relation to IBM, obviously we have to be able to go out and communicate and allow the two to talk, as well as manage each other. So we will also have to provide that type of capability," Korf said.

DEC also focused a great deal of attention on its goal of providing users with a wealth of applications to run over their networks. Henry Ancona, vice-president of business and office information systems, detailed DEC's so-called strategic focus for applications integration. DEC, he said, aims to provide transparent, distributed applications, distributed data management tools, seamless communications between processors and adherence to de facto or industry standards. In the area of distributed data management, Ancona said DEC's goal is that no application code need be rewritten to handle data base management across systems.

"Those that fail to develop the expertise in the software functions are the ones who will fall by the wayside," added Samuel Fuller, DEC's vice-president for research and architecture. □



"...I'm looking for vendors who take a systems approach to networking."

And I find them in *Network World*..."

Robert Stark is Manager of Network Operations for Litton Industries of Beverly Hills, California. He supervises the company's voice network analysts as well as those analysts who provide telecommunications consulting services to Litton divisions.

In this position, he is also charged with establishing specifications and making recommendations for the purchase of network communications equipment. And in order to carry out these responsibilities, Robert turns to *Network World*.

"Reading *Network World* definitely helps me in my job. I get crucial information about the viability of certain vendors, which lets me know if I should enter a business relationship with long-term expectations. In my job I'm looking for vendors who take a systems approach to networking. And I find them in *Network World*, which covers networking from a systems point of view."

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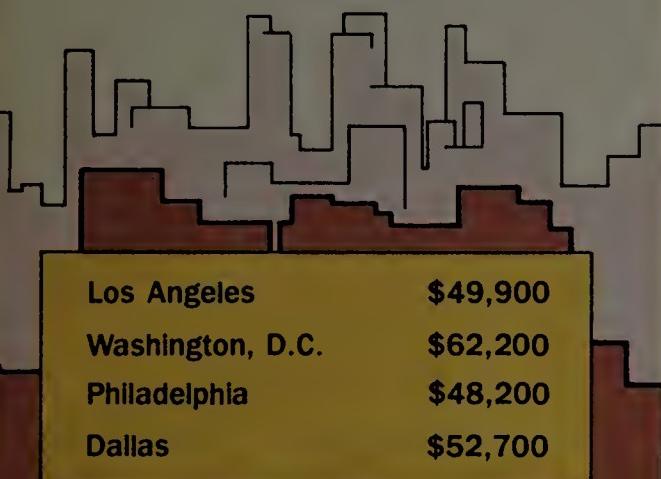
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An IDG Communications Publication

COMMUNICATIONS MANAGER

Average annual compensation
for communications managers
in four major cities



SOURCE: ASSOCIATION OF DATA PROCESSING SERVICE ORGANIZATIONS, INC., ARLINGTON, VA.

► MANAGEMENT STRATEGIES

Selecting the proper maintenance agreement

BY MICHAEL FAHEY

Senior Writer

When it comes to choosing a telecommunications system maintenance agreement, users should evaluate their needs and resources before deciding whether to contract with the manufacturer, sign an agreement with a third-party provider or perform their own maintenance, according to users and consultants contacted by *Network World*.

"You have to look at your staff and your needs when you are deciding on a maintenance

ICA to choose leader

The International Communications Association (ICA) is in the process of replacing former Executive Director Stephen Christie, who resigned shortly after the group's annual conference in May. Frank Burns, a former Minnesota Mining & Manufacturing Co. communications executive, is serving as interim director. ICA officials said they are attempting to fill the position as soon as possible. The executive director is the full-time head of the association.

GUIDELINES

ERIC SCHMALL

Successfully weathering the storms of management transition

Communications professionals are proud of the way they have dealt with change. Buffeted by the storms of divestiture, nearly overwhelmed by the tides of technological change, they have somehow adapted and survived.

Despite these successes, there is one type of change that is never easily navigated; that is, a new leader at the helm.

When a new communications manager is appointed, the changes in the department are often dramatic and immediate. The bonds between the staff and its former leader are dissolved. Assumptions about priorities, long-standing procedures, rules — all the givens — are called into question. Newly assigned managers face their first challenge in the proper handling of the rites of succession. A mistake during this phase can hobble the manager's ability to win staff loyalty and earn credibility.

The first responsibility for managers is to review the department's status rigorously. They need to learn all they can about the technical, financial and personnel aspects of the department. Inquiries must be logical, methodical and nonjudgmental.

New managers who sneer publicly at their predecessors' work are not only tactless but are also jeopardizing the loyalty of their inherited staff. How can the new manager know the thinking that steered past decisions? Besides, attacks on the for-

mer regime can be perceived as unwarranted assaults on the remaining staff. Perhaps they had a hand in the creation or continuation of the old methods.

The second step in the new communications manager's transition is a gesture indicating the new manager is not going to impose an entirely new order.

Early statements that show the staff where the manager expects continuity will lessen their anxiety. New managers should strive to avoid the perception that they are

initiating changes as a display of their organizational mandate and muscle. Nobody needs a crude demonstration of power at this critical juncture.

The final important step for the new manager is to establish the department's strategy based on the manager's long-term view of its direction. This forms the fundamental basis for long-term change. By giving the staff clear explanations of the communications operation's mission and how it will support the organization as a whole, the communications manager can begin to integrate the old order with the new. This will also allay any misgivings that the manager is critical of past operations and that changes in the method of operation are arbitrary.

By explaining the course of action, the new manager can defuse questions about the legitimacy of changes in equipment, procedures, policies and personnel relations. Thus, a potentially disruptive professional change can be successfully negotiated. □

Schmall is network systems manager for an insurance holding company.

agreement," said Carlos Santiago, president of the Harbinger Group, Inc., a Norwalk, Conn., consulting company. "To perform your own maintenance, you really should have four technicians available to provide 24-hour-a-day, seven-day-a-week coverage."

Furthermore, Santiago said, to protect the equipment's resale value, the technicians must be certified by the manufacturer. "There are some savings to be had if you have a big enough operation to justify your own staff," Santiago said.

Eastman Kodak Co. in Rochester, N.Y., has been performing its own maintenance since the early 1970s, according to John Schooley, manager of telecommunications services. "We find that we get better control over our system by doing our own maintenance." Eastman Kodak has eight or nine factory-certified technicians maintaining its more than 35,000-line phone system in Rochester, Schooley said.

Generally, manufacturers and distributors offer two types of maintenance agreements, Santiago said. One is a long-term service contract; the other allows the user to call the manufacturer and pay for time and parts when the system needs service.

Users should be warned, however, that customers with long-term service contracts are given precedence over customers who call for service only when it is needed, Santiago said.

Just what services are included in a maintenance contract can often be negotiated, according to users and consultants. Routine system maintenance generally includes operating system software and hardware upgrades, but users can negotiate additional services.

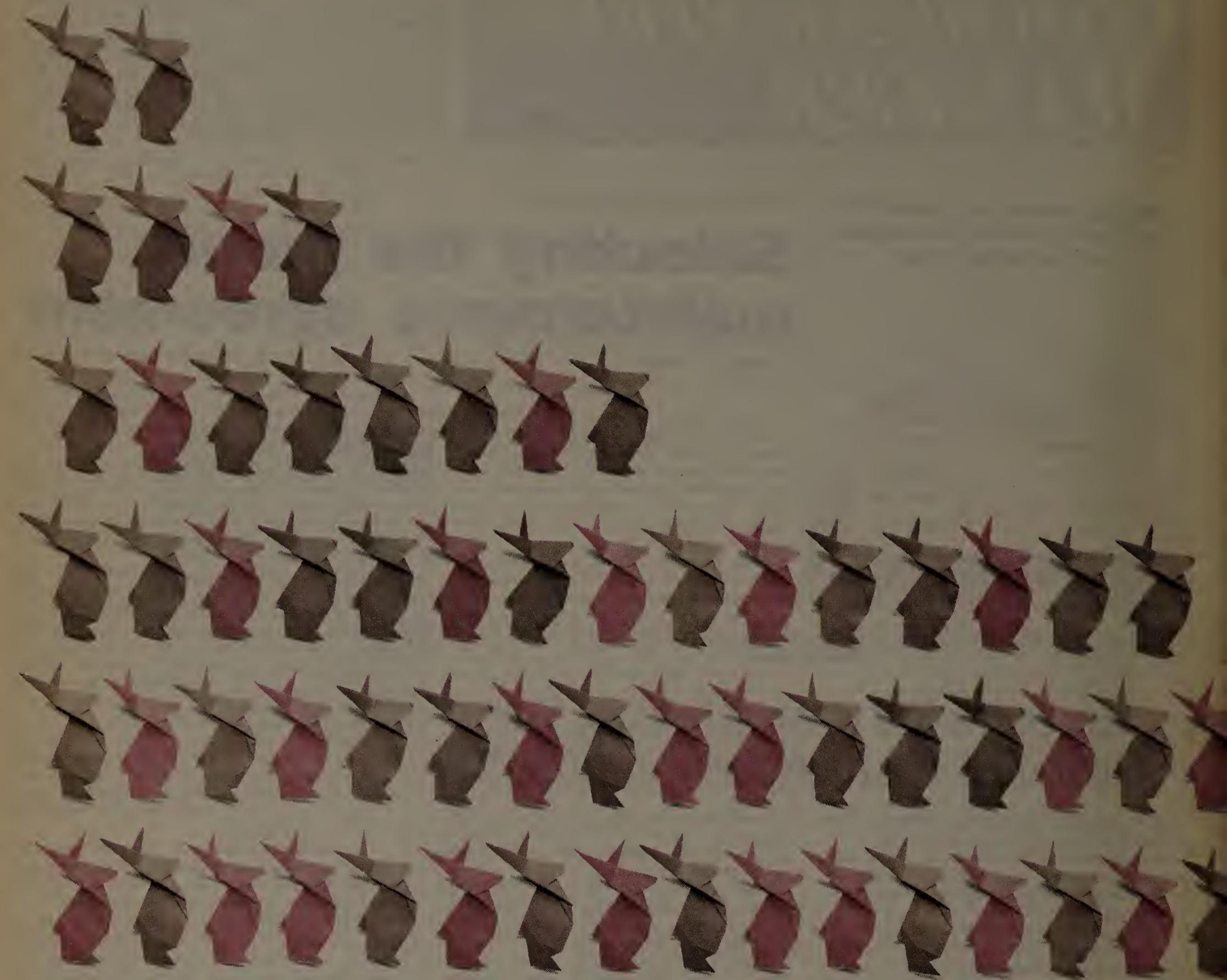
When the University of Hartford in West Hartford, Conn. negotiated a contract with Rolm Corp. to provide a private branch exchange in 1983, the school arranged to have a full-time Rolm technician maintain the PBX for eight hours a day for the 11-year life of the contract, according to John Collins, director of physical plant and telecommunications.

Collins said Rolm was inclined to be generous in its maintenance agreement because it was anxious to sell a newly developed model of its then top-of-the-line VL CBX.

Collins advised users who are purchasing large systems to have their own lawyers draw up the maintenance contract rather than sign the standard contract offered by equipment manufacturers.

Ian Angus, president of Angus Telemanagement Group, a Toronto-based consulting company, agreed that users can often negotiate custom maintenance agreements. Angus said he advises clients to draw up agreements that spell out terms that would otherwise be left open to interpretation.

"Have them, for example, define what is meant by an emergency response and how quickly you get service," Angus said. Users can also obtain a commitment from the manufacturer or distributor to have a specified number of spare parts available in case of emergencies, according to Angus. □



How to avoid the pen

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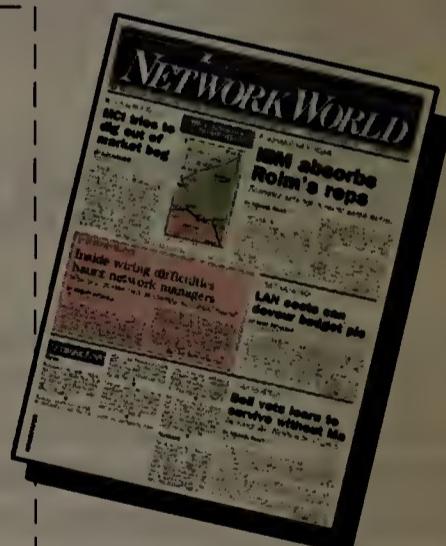
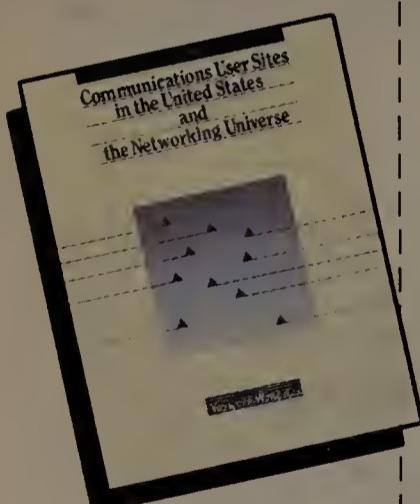
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NEW PRODUCTS AND SERVICES

► SYNOPTICS COMMUNICATIONS

Fiber cabling, concentrator bow

Firm debuts enhancements to LattisNet.

BY MARY PETROSKY

West Coast Correspondent

MOUNTAIN VIEW, Calif. — SynOptics Communications, Inc. recently enhanced its Ethernet-compatible LattisNet to support fiber optics, in accordance with the IEEE 802.3 standard, and introduced a departmental concentrator with half the port capacity of the company's present premises controller.

LattisNet, designed to provide alternatives to Ethernet's traditional coaxial cable wiring, enables customers to implement Ethernet networks in a star topology using fiber-optic cable or shielded twist-

ed pair wire, such as that found in IBM's Cabling System.

SynOptics is also working on a premises wiring scheme based on unshielded twisted-pair wiring, which is expected to be available in September.

Although SynOptics' Ethernet twisted-pair transceivers have been compatible with the IEEE 802.3 standard since their introduction, the company initially supported Xerox Corp. Version 1 Ethernet specifications for fiber, according to Michael Clair, vice-president of sales and marketing. New fiber support is fully compatible with IEEE 802.3.

With the enhancement, SynOp-

tics added support for 50-micron and 62.5-micron fiber in addition to the 100-micron fiber it had previously supported.

AT&T uses the 62.5-micron cable in its Premises Distribution System, Clair noted.

The company also announced a smaller concentrator, designed for use in departments, that supports up to 12 fiber connections or up to 18 connections of IBM-type shielded twisted-pair cabling. The smaller concentrators will allow users to create subnetworks more easily and provide a lower entry cost for LattisNet, Clair said.

SynOptics had previously offered only a 32-connector concentrator for fiber and a 48-connector concentrator for the IBM-type cabling. The company plans to offer both larger and smaller concentrators over time, Clair said.

Pricing for specific components was not available, but Clair said the average cost per node connected would be \$800 to \$900 for the fiber system and \$400 to \$450 for the IBM-type cabling. □

► See comparative review of Avanti's UltraMux 1.5 and Timeplex's Link/2 on page 39.

► KEY STRATEGIES

TIE shows digital key system

BY JIM BROWN

New Products Editor

SHELTON, Conn. — TIE/communications, Inc. recently introduced a digital key telephone system that provides one-button access to Centrex service or private branch exchange features and is said to be compatible with evolving Integrated Services Digital Network standards.

The 32-line, 60-station Onyx consists of a central equipment unit (CEU) to which all of the Onyx's digital 10-button telephone sets connect via two twisted-pair wires. The CEU, which is compatible with Centrex service or PBXs, can be expanded to support 60 trunk lines and 60 stations.

The CEU also hosts a software module that allows any attached telephone to be configured to access up to 10 trunk lines or Centrex or PBX features directly.

Feature access buttons can be programmed at each telephone set or from a master telephone set. The CEU software configurations are held in memory, which a battery back-up system will retain for up to 30 days in the event of a power or system failure.

The system's 10-button telephone can be expanded with the addition of a 20-button add-on module. The 10-button telephone will also support a speakerphone module, while the expanded 30-button telephone will support a 16-character display module that shows date, time, number dialed, line in use and extension numbers.

TIE claims the system will soon support ISDN's 2B+D basic interface, which calls for two 64K bit/sec B channels supporting data and/or voice traffic and a 16K bit/sec D signaling channel.

The firm also said future enhancements to the system will include a data-switching software module, which will allow the system to act as a data switch for RS-232-compatible computing devices connected to the CEU.

Supporting common key system features, the Onyx system is also reportedly compatible with existing AT&T 1A2 equipment key systems. The Onyx costs between \$300 and \$500 per station, depending upon configuration.

TIE/communications is located at 8 Progress Drive, Shelton, Conn. 06484, or call (203) 926-2000. □

► ELECTRONIC MAIL GATEWAY

DA Systems bridges E-mail offerings

BY JIM BROWN

New Products Editor

CAMPBELL, Calif. — DA Systems, Inc. last week introduced a gateway service that links various public electronic mail services and can interface to private E-mail systems.

The service, provided using DA Systems' own personal computer-based ISObridge software, enables customers to send messages to users on any service or system supported by DA Systems, whether that person is a DASnet customer or not. Non-DASnet subscribers, however, can only reach DASnet subscribers via a DA System gateway.

DA Systems maintains electronic mailboxes on several public mail services, and it has received approval from these carriers to act as a gateway service provider.

Using either packet-switched facilities or a dial-up connection, DA Systems periodically accesses its electronic mailbox on each of the systems supported and downloads messages.

Through routing tables maintained on its ISObridge node in Campbell, the firm will determine where each message is destined and convert the message to conform to that service's or sys-

tem's format. The message is then routed and placed in the receiver's mailbox, appearing as a message generated on that system.

The service is aimed at users whose message traffic from one E-mail system to another does not justify becoming a subscriber to both systems.

The ISObridge will also supply a DASnet directory that lets gateway service subscribers determine the proper DASnet addresses for messages being sent across systems.

Services currently supported include AT&T's AT&T Mail, DASnet E-mail, MetaSystems Design Group's DCMETA, Dialcom, Inc.'s Dialcom, New Jersey Institute of Technology's EIES, Western Union Corp.'s EasyLink/Telex, MCI Communications Corp.'s MCI Mail, Networking and World Information's NWI, the Institute for Global Communications' PeaceNet/EcoNet, Portal Communications Co.'s Portal Communications, Source Telecomputing Corp.'s The Source, the Japan-based Twics K.K.'s Twics Bee-line, Patelcomp, Inc.'s Unison and Whole Earth Electronic Link's The Well.

The gateway will also support private electronic mail systems by dialing into and retrieving

messages from systems that support these software packages: Caucus, Participate, Unix, VAX Mail or Wylbur for the IBM 3080 series of computers.

Some E-mail systems, including Patelcomp's Unison, are providing access to the DASnet gateway as a standard feature for subscribers of its own services.

DA Systems is offering individual, system and site subscriptions to the new service. A site subscription allows all users at a specific site to access the service, while the system subscription limits access to users supported by a particular processor.

The firm will charge \$4.50 per month for each individual subscription, while the monthly fee for a system or site subscription will range from \$450 to \$6,000 per month, depending on the number of users.

In addition to the flat monthly fee, DA Systems will charge a message fee for provision of a link between two E-mail systems. That message fee will generally be what DA Systems is charged by the individual E-mail services for downloading and then uploading messages.

DA Systems is located at 1503 East Campbell Ave., Campbell, Calif. 95008, or call (408) 559-7434. □

Opinions

SYSTEMS MANAGEMENT

ANDRES LLANA JR.

Integrate voice and data

Network management systems still have a long way to go before they can meet the needs of today's integrated voice/data networks. While they appear comprehensive in their design concept, a missing link remains. If one were to hear all of the vendor presentations on network management systems, it would soon become apparent that data communications requirements are the driving force. Clearly, voice requirements have been left out of the picture.

The telecommunications equipment manufacturing community continues to ignore the fact that voice systems are the largest single budget item for telecommunications users as a group. Obviously, vendors and users have different views as to the functionality of a network management system and the features that should be part of its architecture.

It may come as a surprise to some users, but network management systems came on the market more in response to competitive needs than to user requests. For example, large manufacturers of modems and multiplexers recognized that one way to dislodge AT&T modems in the market was to introduce an effective means to test and manage an established network.

This, in turn, led to the introduction of proprietary network management systems that work well as long as homogeneous equipment is employed throughout the user's

Llana is director of consulting services for the Vermont Studies Group, Inc. of West Dover, Vt.

network. This strategy, of course, encourages users to depend on a single supplier for their modems and multiplexers.

Parallel to the evolution of hardware-oriented network management tools have been front-end processor-based network performance monitors. These tools were initially used to conduct network analysis by providing "after the fact" statistics, such as response time, number of alerts and retransmission rates. However, they have evolved into more proactive tools and have become one of the more popular methods for the analysis of network performance.

While these advances in data network management promise a glowing future for the data user, they do nothing for the integrated voice user. And even though the new digital voice systems on the market have software to detect circuit outages, there is still no marriage of voice and data circuit assurance measures in "off the shelf" network management systems. Voice systems still need integration into the network management picture.

The network management issue is further compounded by T-1 multiplexer vendors that also provide network management systems. These personal computer-based systems replicate many of the same functions found in data network management systems.

Every vendor, of course, has its own view of what the world of network management should address. None addresses the voice side of a network particularly well, if at all.

Where does this leave the user? In most

cases, the user managing a fully integrated network must have three to four separate management systems. Each of these has its own separate terminal, data base and method of operation. Vendors must soon realize that what the user needs is not more network statistics or better modem control but better total network control.

For this reason, the user community will have to lobby for change if it is to manage its integrated voice and data networks more effectively. Change must come soon in such areas as:

- Performance monitoring software for both asynchronous and synchronous applications operating concurrently in the same network.
- True circuit quality assurance through proactive, comprehensive line-monitoring programs for both voice and data.
- Network equipment management for voice and data connections.
- Network administrative management services.
- On-board expert systems to assist the user in managing and invoking network management strategies.

These capabilities exist today in a plethora of hardware and software systems. Why not bring them together into one system, or at least provide the interface so that an enterprising user could integrate needed capabilities into a single facility?

Of course, when Integrated Services Digital Network becomes as widely available as T-1, might the reasons for network management in its current form disappear? □

REGULATION

STEVE MOORE

Understated pain

"Weaning data users and providers from their convenient but inefficient use of subsidized local exchange carrier voice circuits will likely be a painful and controversial process."

Judging by the furor over the Federal Communications Commission's proposed value-added network (VAN) access charge, the preceding quote from *The Geodesic Network*, Peter Huber's 1987 U.S. Justice Department report on competition in the communications industry, is the understatement of the year.

The personal computer dial-up data base enthusiasts, the data base providers and the VAN service providers are all up in arms, claiming the proposed fees would unfairly raise their costs and have a chilling effect on the entire information industry.

But Huber and the FCC argue that the VANs have had a free ride

so far at the expense of the interexchange carriers, who pay what Huber terms "extortionate" charges for access to local exchange carrier-switched circuits.

"The clean solution," says Huber, "would be to eliminate flat rate pricing of circuit-switched facilities, eliminate the interexchange carrier cross-subsidy by fully implementing the FCC's \$6 subscriber line charge and charge national VANs the same traffic-sensitive access tariffs assessed to interexchange voice carriers."

Why isn't this "clean" solution popular, given today's pro-competition, anti-regulation climate? Because it would be a big step toward cost-based pricing for all communications services — and when it comes to pricing, a level playing field is definitely not in the interest of the VANs. They want to be treated as users, not carriers.

And, like many other communications service providers that have flourished under regulated competition, the VANs realize that a

fully deregulated market would work against them. Having observed the plight of AT&T's competitors in the long-distance market, the VANs favor equalizing competition only to the extent that it benefits them.

If Huber's solution were implemented, long-distance rates would probably fall sharply, though not nearly enough to offset the negative effect on the VANs of the proposed local access charges.

But if the FCC's proposed access charge is imposed without also eliminating the interexchange carrier cross-subsidy, the VANs would be hamstrung, and the Bell operating companies would be in hog heaven.

The BOCs currently may offer only local packet-switching services. If they succeed in convincing the FCC to end the prohibition on their entry into the information services and interexchange services markets, they'll have a green light to compete head-to-head with the VANs by offering electronic

mail, data base access, electronic data interchange and other enhanced services, both locally and interexchange.

And then there's AT&T, which already competes against the VANs with its Accunet interexchange packet service and is lobbying hard for additional regulatory relief in the form of an end to the FCC-imposed cap on its long-distance profits. AT&T's deep pockets are already capable of absorbing most of the proposed access charge without passing it along to users. In view of the VANs' thin wallets

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Moore is features editor of Network World.

Opinions

►TELETOONS — By Phil Frank

The Communication Manager's — Handbook — Guideline #8 "How to spot a bad idea."



nd other handicaps, AT&T may be encouraged to resurrect its Net 000 service under a new name.

The VANs' fundamental problem is that they are all still too dependent on revenue from protocol conversion — a service that is often considered value-added, but seems destined to become basic.

With eight behemoths ranged against them and the threat of access charges hanging over them, the VANs' survival will depend on their speed in de-emphasizing protocol conversion and developing ancier, application-specific value-added services.

Local access charges would make the VANs vulnerable in the large-user data market because those users can build private packet nets if third-party service costs rise. Huber's report points out that the VANs are particularly at risk in the small-user data market because the BOCs are eager to migrate data users off crowded local circuit-switched facilities onto their nascent packet networks and from there to future Integrated Services Digital Networks circuits. So, how can access charges be imposed without destroying the VANs and putting a damper on the formation industry? Given that

the BOCs have been more profitable than anyone else in the industry and that they are even now viewed by smaller competitors as juggernaut market-spoilers, why not tarnish Huber's clean solution?

Implement all of the FCC's proposed \$6 subscriber line charge and eliminate the interexchange carrier cross-subsidy. But then, instead of imposing a \$5-per-hour VAN access charge, institute a much smaller charge and reduce the "extortionate" interexchange carrier access charge to match.

Finally, allow the BOCs to enter the information services and interexchange services markets freely. Then, with higher basic local rates and significantly lower traffic-sensitive costs for both long-distance transmission and the provision of enhanced services, a mass market for information services might finally emerge.

No matter which special interests the FCC eventually chooses to indulge, the end result will likely be a further shift toward cost-based pricing. All vendors affected by that shift will quickly pass their additional costs along to their customers. So Huber's understatement begs this corollary: As usual, users will feel most of the pain. □

STANDARDS
JAMES CARLINI

The Wizard of ISDN

We're off to see the Wizard, the wonderful Wizard of ISDN. Because, because, because, because . . . Check it out, Toto. We're following the yellow brick road painted by the local operating companies and other vendors when they talk about all the new applications that will be possible with Integrated Services Digital Networks. Too bad there are a lot of Cowardly Lions out there who will not change their systems until everything has been completely tested and proven by someone else.

This is not what ISDN proponents want to see. The pressure is on vendors to develop some new products that are somehow enhanced by ISDN. The problem is, we haven't gotten over the rainbow yet to see any earth-shattering applications, let alone some complete standard for the concept.

This industry hears too many sales pitches and reads too many requests for proposal that state "full ISDN compatibility." You cannot guarantee compatibility with a standard that has not yet been fully developed or agreed upon by the Consultative Committee on International Telephony and Telegraphy.

There are too many companies jumping the gun with their approaches to selling ISDN. They should learn how to sell, or their theme song will be, "If I Only Had a Brain."

Who's behind the curtain in the Land of ISDN? Sitting in on different vendor sales pitches won't give you any real idea. If you've been there, you know there are plenty of thunderous speeches, fireworks and smoke. Especially smoke.

Credit must be given to vendors for pumping a lot of money and resources into the Land of ISDN. However, this still has not given us a magical application that works with what we have in place.

The applications proposed so

Carlini is president of Carlini & Associates, a management consulting firm in Westmont, Ill. He also lectures on information technology at Northwestern University in Evanston, Ill.

far have been limited, unless you are willing to change all of your existing equipment for new ISDN-based equipment. Try explaining that to upper management without hitting them over the head.

An alternative is to buy terminal adapters — \$100-a-pop digital service-type units — to give your current equipment connectivity to ISDN lines. Imagine a big tornado sweeping up your company's cash box.

What about the pioneers? So far, no one has come up with an application that will do something new, innovative and inexpensive that cannot be done by existing equipment.

Beta testers in various states, including McDonald's Corp. in Oak Brook, Ill., have been testing some basic telephone and data systems.

I swear I've seen some flying monkeys headed toward the McDonald's up the street, but that's the chance the hamburger empire took when it went down the road first.

"Ding dong, the switch is dead" was what they

Who's behind the curtain in ISDN Land?

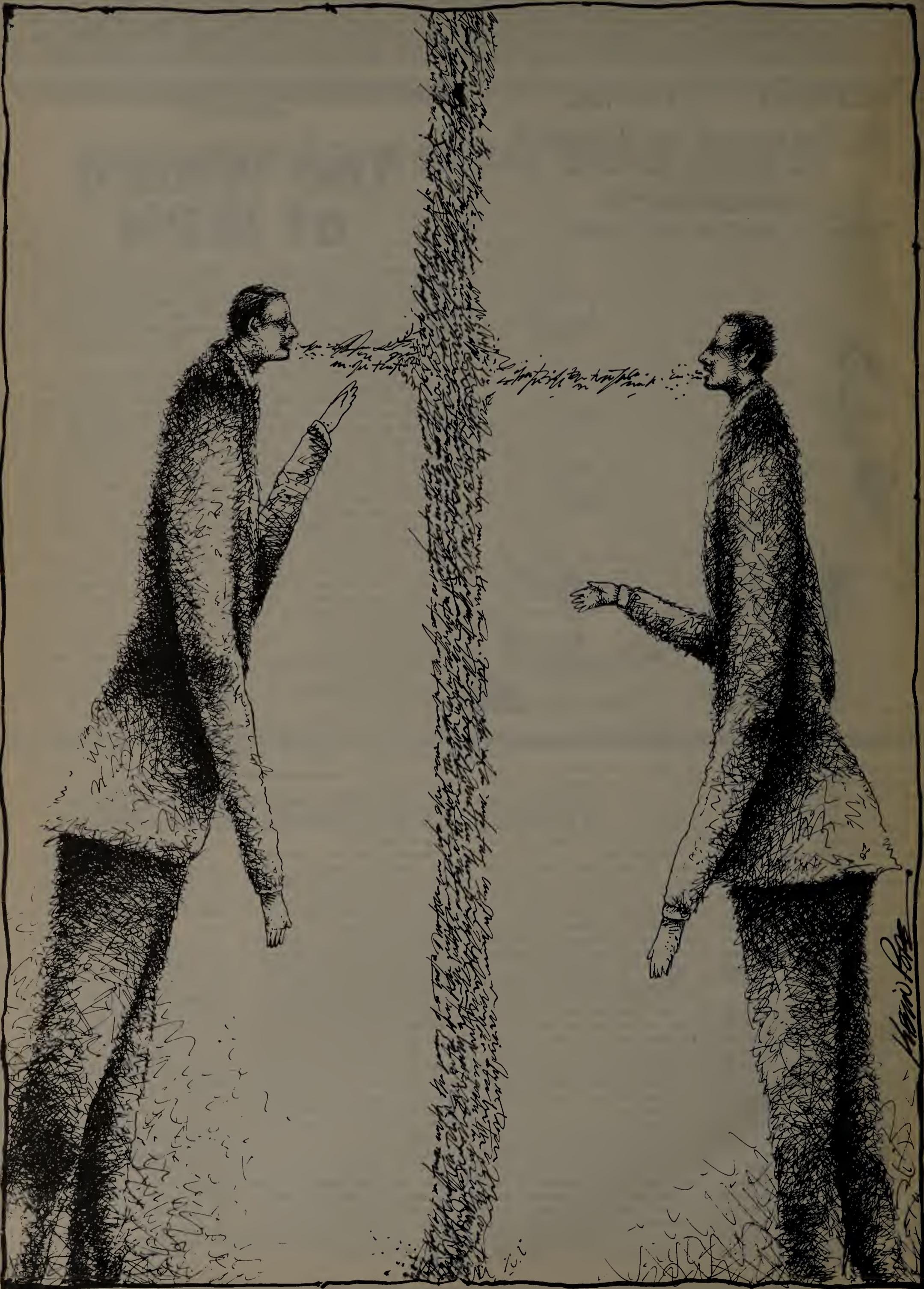
were singing in Oak Brook when a new central office was cut over and its switch went dead for two hours.

Some of the preliminary applications that have been suggested hold up under practical scrutiny about as well as the Wicked Witch under a bucket of water.

One suggested application enables a telemarketer to trace a caller's telephone number back and link it to information in the telemarketer's data base. The problem is, no real percentages are available on the accuracy of such a system. And the potential for nuisance calls and other errors is about as high as the Wizard's balloon on the way back to Kansas.

Until a new and creative application appears that provides some unique, competitive edge, all of the vendor project manager munchkins trying to develop that ultimate strategic service will be searching for an answer.

Users should wait to see what develops before taking too many steps down the ISDN yellow brick road. □



Features

July 6, 1987

► **NETWORK DIAGNOSTICS**

Contradiction in terms

Continued from page 1

fashion, passing a string of bits satisfactorily, as the user requested. But in this case, "test" to the engineer means "monitor" to the user, and the engineering mind-set and system architecture conspire against a mutual understanding.

Telecommunications professionals and their frustrated users have become ensnarled in a semantic tangle that has muddied everyone's thinking and wasted their energies. Perhaps because many managers are engineers and mathematicians — programsmiths rather than wordsmiths — they've forgotten that the words used to define processes have the power to shape those very processes.

Innocuous terms such as test and monitor are unambiguous and straightforward until managers pause for a moment to see what has happened. What's needed is a standardization of the terms with which network diagnostic procedures are defined.

Diagnostics paradox

The concepts of testing, surveil-

Bernstein is executive director of switching and network operations at AT&T Bell Laboratories in Middletown, N.J. Yuhas is a freelance writer in Short Hills, N.J.

When it comes to maintenance, users and technicians don't speak the same language.

lance, monitoring and measurement are seen, paradoxically, as discrete but often interchangeable activities, a mistaken impression that affects the way systems function. These terms describe a continuum of involvement that can provide a lexicon for effective maintenance and assured service.

Even more important than sorting out terminology and being exact in describing methods is ensuring the reliability of circuits and networks. Also, integrated mea-

surement/monitoring capability should be implemented to maintain digital communications systems.

Maintenance of analog networks has traditionally consisted of testing and surveillance. The testing of analog circuits was concerned with noise, attenuation and a match of the electrical characteristics to the user's services. Surveillance used telemetry and instrumentation to detect facility and switch failures when they occurred.

The two were usually separated because different tools were used for each function. One had a service orientation while another had a network orientation that grew independently in traditional networks. While these two maintenance techniques grew independently in analog networks, today's technicians must be concerned with both services and networks.

The inherent flaw in network management systems architectures that separates these techniques is becoming more apparent as digital networks evolve. Lightwave systems and terminal equipment allow more users to be served by a single facility, making the consequences of network element problems more severe.

Technicians need early warning so they can schedule preventive maintenance. The alternative is to react to sudden outages that take

Continued on next page

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large numbers of users out of service simultaneously while problems are isolated and fixed. Technicians need to know where incipient service problems are before they become apparent to users.

Finally, technicians must make trouble conditions on high-capacity systems known to the service provider's personnel to speed restoration. Stand-alone telemetry hardware exists to meet these

and below) maintenance.

In the latter case, the known signal injected by the test equipment is usually a pseudorandom bit sequence that the receiving test equipment can duplicate for purposes of detecting bit errors. Monitoring with surveillance access is typical of current alarm surveillance and control systems as well as performance monitoring systems.

Monitoring with testing access is an uncommon maintenance ap-

without service interruption and with the user's data on the line.

T-1 testing

There may be an advantage to using the user's signal, rather than a test pattern, at least with elusive problems on T-1 lines. In a detailed study of error performance, AT&T Bell Laboratories found that lines selected for further study on the basis of high in-service error rates were frequently error-free when taken out of service and stimulated with a pseudorandom test pattern. When the lines were put back into service, the errors returned.

The effect may possibly be attributed to bit-pattern dependence of the error process. This experience is similar to digital computer maintenance, where bugs are often found in the hardware or computer logic.

Often, a piece of the user program is captured in a test driver. This test driver is then run thousands of times to isolate the problem, and when the problem is found, the driver is run again to ensure it has been fixed. Analogous approaches are needed for digital circuits.

At line rates of DS3 and above, measurement with surveillance access can take two forms: a directed

eliminates the need for testing by associating the proposed measurement with a known high-capacity facility failure.

Figure 2 shows how these methods fit into the maintenance of a circuit. When a user initially orders service and the lines are installed, the user company's technicians need to do some testing to assure the service is at the level expected. The first step is to provide a test measurement. Eventually, after a period of satisfactory service, the circuit may degrade, and an alarm may be generated by the user's network management system indicating that service is still at the level promised but that the safety margin is lost. This is surveillance monitoring.

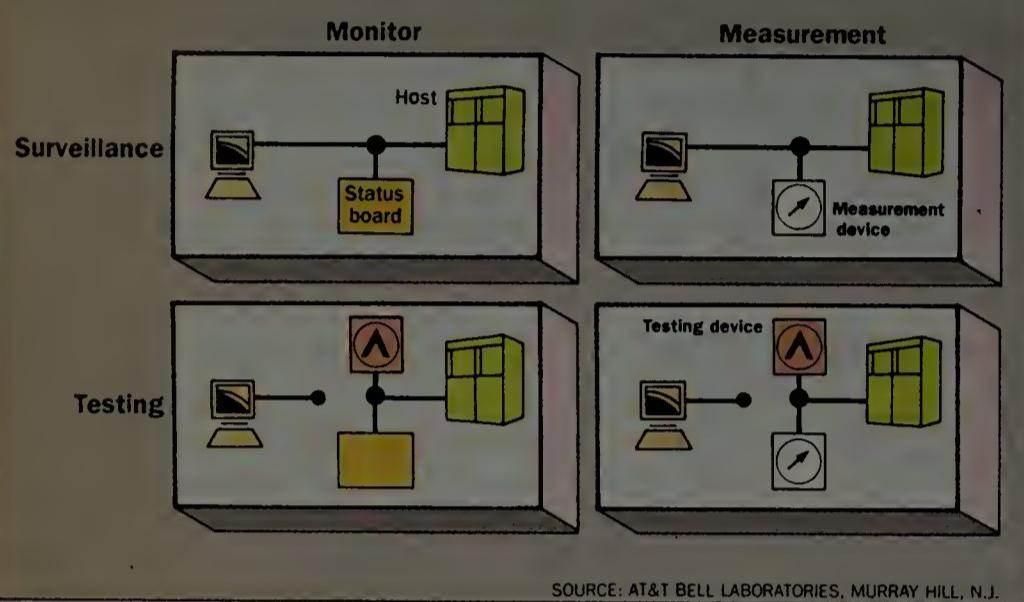
Next, the network management system may direct the monitoring equipment to listen to a particular user circuit or facility where the alarm originated. This is surveillance measurement. If the results indicate that there is a problem, the user contacts the service provider, which dispatches a technician to fix it.

At this point, a surveillance measurement can be made to see if the circuit is back within tolerance limits. A test measurement and its associated user outage might be avoided completely, unless the user wanted a standard test to verify service, above and beyond the experience of trouble-free operation.

Certainly, the particular application of testing and surveillance will vary with the user organization. However, a tremendous advantage would accrue in the eyes of the end-user and in the ability

Network diagnostic methods

Figure 1



SOURCE: AT&T BELL LABORATORIES, MURRAY HILL, N.J.

needs. For example, bit error rates on T-1 facilities, errored seconds and bit error rates directly in the hardware can all be measured. At issue is how to combine this information to provide a sensible, orderly maintenance plan for digital networks.

Defining terms

Surveillance and testing are both methods of access to information. Surveillance is the unobtrusive bridging or "camping on" of equipment onto circuits without affecting their performance or user service. Surveillance can be continuous or on a scan/sample basis, occurring only when a result deviates from the norm. By contrast, testing is disruptive; a circuit must be taken out of service and reconfigured to apply a reference signal and a detector.

Monitoring and measurement denote the use of acquired information once surveillance or testing access has been gained. Monitoring presents discrete events that have been recognized as unusual, such as failures or signals crossing preset thresholds. Measurement is the selective collection over time of data that is later analyzed.

Systems that allow monitoring and measurement are typically two-way systems. They send data for human analysis and then accept signals to make changes in the operation of the network, such as switching in backup circuits or turning off audio alarms.

The access/use combinations shown in Figure 1 suggest two familiar and two uncommon network diagnostic methods.

Measurement with testing access is the most familiar — and most expensive — combination, typical of analog service and low-speed digital service (64K bit/sec

Standardizing the terms "testing," "measure" and "monitor" could eliminate expensive routine testing and endless redundant testing.

proach. It entails removing a circuit from service, applying a known signal and using existing monitoring equipment at a distant point to infer the effect on the circuit. The measurement with testing access method, with inexpensive loop-back devices deployed at various points along the circuit, is usually preferred over this approach. It's used routinely to check telemetry circuits themselves.

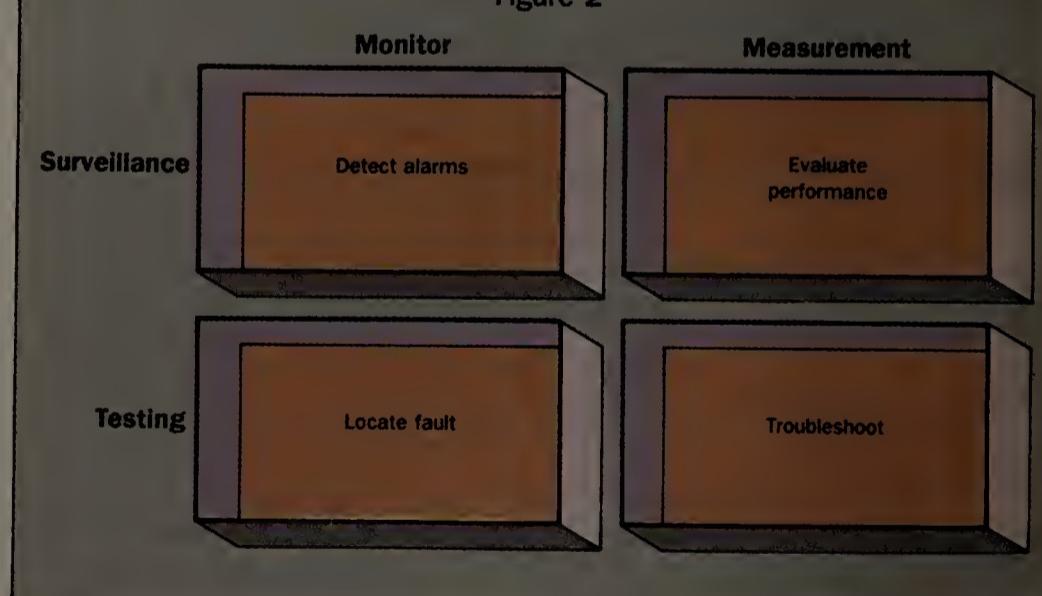
Measurement alternative

Perhaps the most promising and underutilized alternative to full-blown measurement with testing access is measurement with surveillance access. This hasn't found practical analog service application; that would involve measuring analog impairments on a live circuit in the presence of strong speech or voiceband data signals, a proposition only now coming within the practical economic reach of digital signal-processing technology.

A digital circuit, however, requires only a directed line-performance monitor. A performance monitoring unit — perhaps a scanning device that up to now has been monitoring many T-1 lines — is instructed to camp on a line that would otherwise need testing because of a trouble report or suspicious surveillance-monitoring result. This allows possibly long-term performance measurement

Applying diagnostic techniques

Figure 2



SOURCE: AT&T BELL LABORATORIES, MURRAY HILL, N.J.

line-monitoring action using the error detection features of the DS3 framing scheme, or, if an intelligent network element (multiplexer or digital cross-connect) is in the path, a simple readout of the performance registers maintained by that element at two points in time.

Maintenance technicians who usually do test measurement have a strong need for the type of information that is gained from surveillance measurement for two reasons. First, surveillance measurement is an excellent surrogate for test measurement, especially at rates of DS1 and above. Second, surveillance information often

of the communications manager to schedule repairs on a preventive basis through the use of an integrated measure/monitor capability.

Standardizing the terms "surveillance," "testing," "measure" and "monitor" will go a long way toward resolving communications problems among people charged with keeping digital communications systems working. Such standardization could eliminate expensive routine testing and endless redundant testing when problems are found, speed problem-solving and move maintenance from crises to orderly programmed work.

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Product Focus: Mid-range multiplexers

Caught in the middle

BY JOHN J. HUNTER
Contributing Writer

Early statistical multiplexer vendors established their market by allowing terminals to borrow time on a high-speed link; now some of those vendors are living on borrowed time. When they hit the market in the late 1970s, statistical time-division multiplexers were a sales smash for pioneers like Codex Corp., InfoTron Systems Corp., Microm Systems, Inc. and Timeplex, Inc.

However, as applications have changed and users have become more sophisticated, the basic point-to-point statistical multiplexer that handles asynchronous data and a single 9.6K bit/sec high-speed link has dropped from its position as a sales leader in some companies. In addition, the statistical multiplexer's high-end brethren are facing such stiff competition from T-1 multiplexers that they're in danger of losing market share.

Most vendors have recognized these changing markets and have taken steps to reposition their products. Others, however, have been slow to change. "Some products are too inflexible to change, and some vendors are too steeped in traditional [statistical

multiplexer] applications. They don't realize they're on thin ice. Spring is almost here," says Tim Zerbic, vice-president of technology for Vertical Systems, Inc., a consulting firm in Dedham, Mass.

Market segments

The statistical multiplexer market is currently divided into three segments: low-end, mid-range and

tions involving one to four different end points. High-end statistical multiplexers handle everything above 32 ports. These units sport several high-speed links and sophisticated switching and control capabilities.

The three market segments are changing radically, however, as low-end vendors migrate to provide mid-range capabilities and mid-range vendors offer more high-end capabilities. The reason behind this migration lies in the basic tenet of successful marketing: Give the customers what they want.

"It's really a matter of user sophistication," says Fred Dawsey, multiplexer product manager for Racal-Milgo, Inc. "Many people who had strictly a point-to-point orientation are now recognizing the networking capabilities of stat muxes and want them," he says.

Further, according to Dawsey, as the price of mid-range products falls, customers have a much easier task of justifying them instead of buying several of the simpler, low-cost units.

One user who confirms Dawsey's observation is Chris Stine, director of MIS for Leading Office Products Co. in Secaucus, N.J. Stine says his company purchased ComDesign, Inc. RS-2000 multilink statistical multiplexers to replace several point-to-point four- and

Continued on page 32

High- and low-end vendors are putting the squeeze on the mid-range multiplexer market.

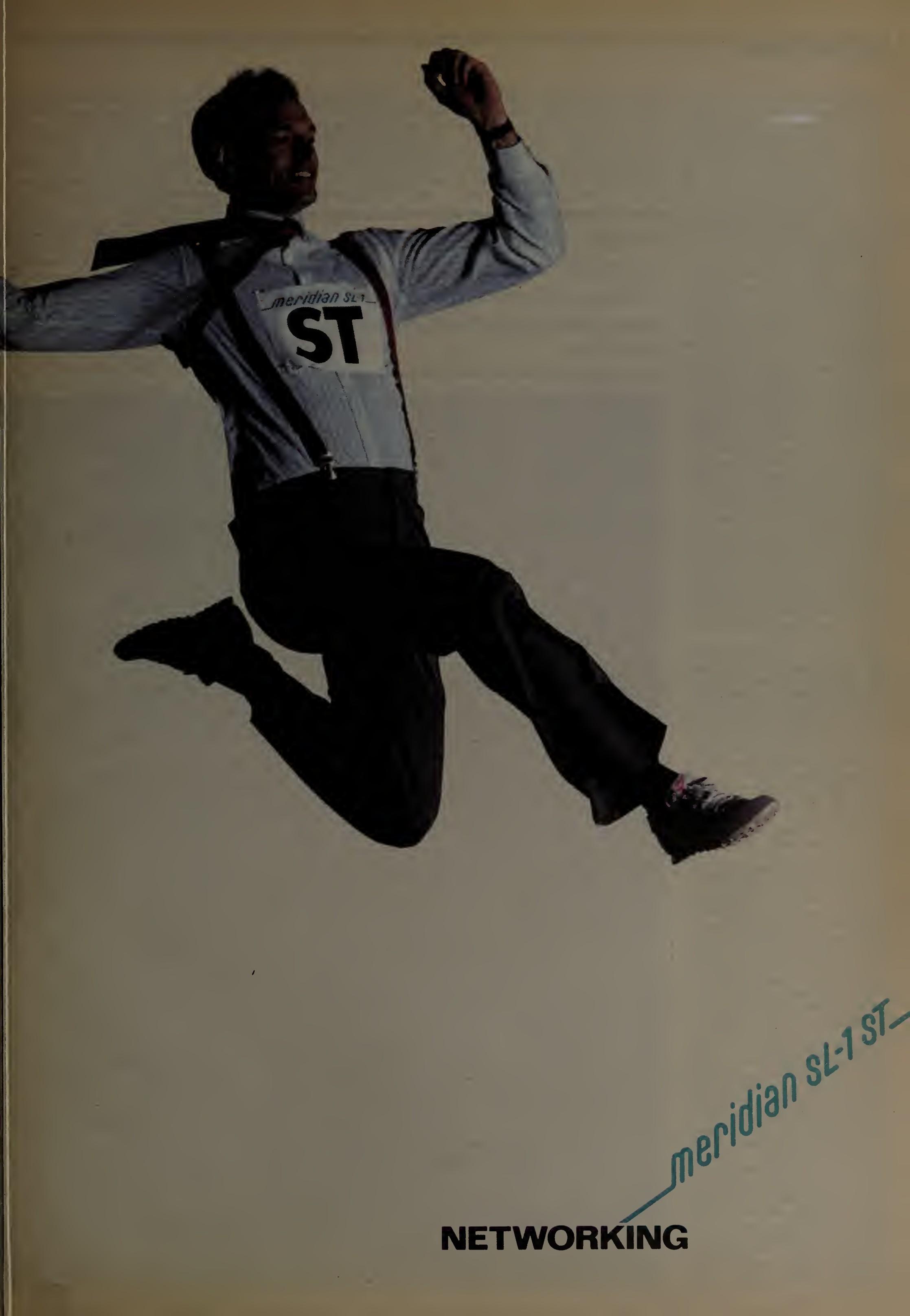
high-end products. Low-end units support two to eight input channel ports and serve users with basic needs such as point-to-point single-link transmission at speeds of 9.6K and 19.2K bit/sec.

The mid-range products, the subject of this product focus, typically handle from eight to 32 ports and are designed for companies with point-to-point communica-

Hunter is president of TMS Corp., a marketing management consulting firm in Devon, Pa.

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NETWORKING

From page 29
eight-channel statistical multiplexers about a year ago. "We have 16 different locations linked by multiplexers and wanted centralized control and the ability to easily tie all offices together."

Now that Leading Office Products has had a taste of networking, it wants increased capabilities such as more high-speed links and automatic alternate routing.

Mike Bissey, product line manager for Infotron's statistical multiplexer family, has also seen an increased demand for sophisticated networking services at every level and says he believes the entire market will resegment to meet user demands.

"In the near future, the low-end products will look like the current mid-range, while mid-range will grow to 96 channels or more and six high-speed links, features which are now more typical of the high-end products," according to Bissey. He says he also thinks network architecture will employ star configurations with cascading statistical multiplexers feeding into a T-1 multiplexer that functions as the star's hub.

The current low end, Bissey feels, will always have a market, since there are legions of companies that need only four and eight channels and a single high-speed link. However, the growth will be nowhere near what it was, Bissey says.

Mark LaRow, a group manager with the Fairfax, Va., consulting firm Network Strategies, Inc., agrees with Bissey's assessment. He predicts that the high-end statistical multiplexer products will lose market share to the newer networking-type T-1s, and the low-end units will be used as asynchronous data feeders to T-1s.

Rick Villars, a senior market analyst with the market research firm International Data Corp. in Framingham, Mass., says his research also supports this prediction.

In a study just completed, Villars found user demands increasing for more sophisticated networking and most vendors repositioning their product lines as outlined by Bissey. He also attributes the strong growth of T-1 multiplexers to the attractiveness and availability of T-1 transmission facilities in general and to the fact that large users are moving to use T-1 multiplexers for networking.

T-1 networking problem

While T-1 networking looks intriguing, its lack of central point control may slow its integration with large statistical multiplexer networks. Currently, statistical multiplexers, like T-1 multiplexers, have their own management facilities, and the two do not speak to each other. As a result, users can't establish a single integrated relational data base that will report all system problems and accumulate statistics for billing.

Most of the large networking companies, such as Network Equipment Technologies, Inc., Timeplex, Infotron and Digital

Communications Associates, Inc. (DCA), are working to establish a central point of control, but none offers an integrated capability. The Infotron and DCA network controllers use Sun Microsystems, Inc. terminals and split screens to view different statistical multi-

plexer and T-1 multiplexer network configurations. They permit the operator to control individual components on each network. However, a different command language syntax must be used for each network.

Joe Rosenthal, vice-president of

marketing at DCA's Network Communications Group, says DCA is developing a centralized facility that will establish a central data base and analyze, as well as record, the cause of alarms and failures. The new product will also use a standard command language that will make internetwork control appear seamless to the network operators. This will let the operators control the T-1 and statistical multiplexer networks using a common syntax, according to Rosenthal. The availability of integrated, centralized network control is more than just a user convenience; it may also be important to the growth of the statistical multiplexer market.

Continued on next page

While T-1 networking looks intriguing, its lack of central point control may slow its integration with large statistical multiplexer networks.

Sometimes you have a lot of information to send but your system doesn't have the capacity to handle it. People have to wait, machines have to wait, because you can't get through. The answer is to expand the system. But how?

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From previous page

Vertical Systems' Zerbic says the statistical multiplexer market will take off when such control becomes available. While some users can live without it, large users want it, he says.

In addition to repositioning products by adding more channels, high-speed links and sophisticated switching, many vendors intend to stay competitive by increasing the data-handling capabilities on the input and link side. Other vendors are adding more functionality, such as X.25 Level III interfaces, synchronous data handling and multiple high-speed links.

Two vendors, Case Communications, Inc. and Micom, have gone further by offering products that

can change the personality of the statistical multiplexer by adding plug-in modules. The Case Openline 81X and Micom Box Type 5, for example, can be changed from a basic unit to a product with port-sharing or X.25 capabilities by swapping modules. (The Micom

Box Type 5 is included in the chart on page 34; for a description and analysis of the Case Openline 81X, see "Multifunctioning multiplexers," NW, May 19, 1986.)

The trend toward increased link speeds and X.25 capability is evident in the comparison chart.

Network managers would be smart to choose products that can be easily expanded or modified to add more capability when processing demands change.

Products offered by Prentice Corp., Tellabs, Inc., ComDesign, Scitec Communications Systems, Penril Data Communications, General DataComm, Inc. and Case all have multiple links that operate at 56K bit/sec and above. That makes them attractive to users who wish to migrate to all-digital services, as well as those who want a high-speed facility to link to T-1 multiplexers. The higher link speeds will also allow those statistical multiplexers to handle more terminals should the vendors choose to add that capability at a later time. None of the products listed, however, has done much to increase the data input handling above what is now considered traditional asynchronous speeds of 9.6K and 19.2K bit/sec. Although several products support asynchronous and synchronous inputs, the speed limitation inhibits the overall utilization of the products.

However, that may change soon, according to Infotron's Bissey. "Stat muxes will have to accommodate higher input speeds to handle applications like [remote job entry]. The current speeds limit users with large file transfers, and those applications are growing steadily," he says. Bissey adds that products with multiple trunks operating at 64K bit/sec and above will become more common and more products will offer X.25 Level III.

"There's no question that a packet network interface is important, especially for large companies with distributed smaller offices or special applications that don't lend themselves to stat muxing," says Racal-Milgo's Dawsey. The smaller offices, he says, often transmit data less than two hours a day at 1,200 bit/sec or less. The packet network serves the networking needs of those people at a reasonable cost. The penalty is that users lose control of those network segments.

Adding increased capability is only part of the statistical multiplexer story. The other component for success is reduced price. Since vendors in the high-end market have already developed software for the sophisticated switching and control facilities used with statistical multiplexers, adapting it to down-sized units shouldn't be that difficult. In some cases, it involves only repackaging.

Lower costs for microprocessors, random-access memory and other hardware components are helping to drive down prices. With vendors providing more capabilities at better prices, network managers would be smart to choose products that can be easily expanded or modified to add more capability when processing demands change. Many of the current crop of mid-range statistical multiplexers appear to have that flexibility.

Users would be wise to invest some time investigating which companies and products have staying power before making a commitment. Some may be skating on thin ice. Without such preparations, users risk following vendors who go under as the market heats up. □

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Mid-range multiplexers

| Vendor | Model | Configuration | I/O ports | Port speeds (bit/sec) | Maximum aggregate input (bit/sec) | No. of links; maximum speed (bit/sec) | Flow control | Internal modem | Redundant logic or power | X.25 interface | Price |
|--|----------------------------|---------------|-----------|--|-----------------------------------|---|-------------------------------|----------------|--------------------------|----------------------|--|
| Amdahl Communications, Inc. Richardson, Texas | 2500 SM | PP | 8 to 32 | 50 to 9.6K asynchronous or synchronous | 307.2K | 1; 56K or 64K | XON/OFF, ENQ ACK | ✓ | | | \$4,350 (8 ports), \$9,575 (32 ports), \$2,195 (modem) |
| Anderson Jacobson, Inc. San Jose, Calif. | AJ 2100 | PP | 8 | 50 to 19.2K asynchronous | 153.6K | 1; 72K | XON/OFF, EIA | | | | \$1,495 |
| AT&T Morristown, N.J. | Dataphone II 718 | PP, ML | 8 to 32 | Up to 9.6K asynchronous or synchronous | 307.2K | 2; 76.8K each link | XON/OFF, EIA, ENQ ACK | ✓ | | | \$3,200 (8 port), \$8,950 (32 port), \$4,550 (dual link facility), NA (modem) |
| Case Communications, Inc. Columbia, Md. | 8XX series | PP | 4 to 32 | 50 to 19.2K asynchronous, 50 to 9.6K synchronous | 307.2K | 1; 80K (5 links optional) | XON/OFF, EIA, ENQ ACK, Tandem | | | | \$1,495 (4 ports), \$9,700 (32 ports) |
| Codex Corp. Canton, Mass. | 6015 INP | PP | 1 to 16 | 50 to 19.2K asynchronous or synchronous | 115K | 1; 19.2K (redundant link optional) | XON/OFF, EIA | ✓ | | | NA (1 port), \$4,000 (16 ports), \$750 (redundant link), \$1,450 (modem) |
| ComDesign, Inc. Santa Barbara, Calif. | RS-2000 | PP, ML | 4 to 32 | 50 to 19.2K asynchronous | 614K | 4; 19.2K or 64K | XON/OFF, EIA, Tandem | ✓ | | | \$4,800 (8 ports, 4 links, 19.2K bit/sec) \$9,600 (32 ports, 4 links, 19.2K bit/sec), \$800 for 64K bit/sec links for either model |
| Datagram Corp. E. Greenwich, R.I. | DM 408 Steamer | PP | 8 | 50 to 19.2K asynchronous or synchronous | 153.6K | 1 (plus 1 for load balancing); 19.2K | XON/OFF, EIA | | Both | ✓ (Level II) | \$10,000 |
| Dataproducts New England, Inc. Wallingford, Conn. | DP MUX-2048 AT (Tempus) | PP | 4 to 64 | 50 to 19.2K asynchronous | 1.228M | 1; 2.048M | XON/OFF | | | | \$8,600 (4 ports), \$15,800 (64 ports) |
| Data Race, Inc. San Antonio, Texas | MACH | PP | 4 to 16 | 50 to 19.2K asynchronous | 76.8K | 1; 9.6K | XON/OFF, EIA | ✓ | | | \$895 (4 ports), NA (16 ports) |
| Digital Communications Associates, Inc. Alpharetta, Ga. | Series 120 | PP | 8 to 32 | 50 to 9.6K asynchronous | 307.2K | 1; 9.6K or 19.2K | XON/OFF, ENQ ACK, EIA | | | ✓ (Level II and III) | \$3,795 (8 ports), \$8,195 (32 ports), \$500 (split channel), NA (X.25) |
| Gandalf Data, Inc. Wheeling, Ill. | Mux 2000 SMUX | PP, ML | 4 to 16 | 50 to 19.2K asynchronous, 1.2 and 9.6K synchronous | 153.6K | 2; 64K each | XON/OFF, EIA, ENQ ACK | | | ✓ (Level II and III) | \$2,050 (4 ports), \$3,850 (16 ports), \$1,000 (X.25) |
| General DataComm, Inc. Middlebury, Conn. | GEN*NET 1264 | PP, ML | 4 to 96 | 75 to 19.2K asynchronous | 256K | 4; 64K each; 1; 256K | XON/OFF, EIA, ENQ ACK | | Power only | ✓ (Level II and III) | \$4,000 (4 ports and 2 links), \$12,000 (32 ports and 4 links), \$2,200 (X.25 with 4 ports) |
| Infotron Systems Corp. Cherry Hill, N.J. | 600 Series | PP, ML | 16 to 32 | 50 to 9.6K asynchronous or synchronous | 307.2K | 2; 19.2K single link or 9.6K dual links | XON/OFF, EIA | ✓ | | ✓ (Level II) | \$1,900 (16 ports, 1 link), \$2,520 (16 ports, 2 links), \$2,800 (32 ports, 1 link), \$3,370 (32 ports, 2 links), \$500 (X.25) |
| Micom Systems, Inc. Simi Valley, Calif. | Box Type 5 | PP, MP | 8 to 32 | 110 to 19.2K asynchronous or synchronous | 115.2K | 1; 19.2K synchronous or 9.6K asynchronous | XON/OFF, EIA, Tandem, ENQ ACK | ✓ (DSU/CSU) | | ✓ (Level II and III) | \$3,250 (8 ports), \$6,850 (32 ports), \$1,900 (9.6K modem), \$800 (DSU/CSU), \$300 (X.25) |
| Multi-Tech Systems, Inc. New Brighton, Minn. | Multi-Mux MM 908 | PP | 4 or 8 | 300 to 9.6K asynchronous | 19.2K | 1; 14.4K | XON/OFF, EIA, ENQ ACK | ✓ | | | \$1,095 (4 ports), \$1,395 (8 ports), \$1,100 (modem) |
| Paradyne Corp. Largo, Fla. | DCX 825/871 | PP, ML | 4 to 32 | 50 to 9.6K asynchronous or synchronous | 76.8K | 2; 19.2K single link and 9.6K second link* | XON/OFF, EIA, ENQ ACK, Tandem | ✓ | | | \$2,200 (4 ports), \$6,800 (32 ports), \$1,000 (modem) |
| Penril Data Communications, A Division of Penril Corp. Gaithersburg, Md. | VCX-150 | PP, ML | 4 to 32 | 50 to 19.2K asynchronous | 153.6K | 2; 56K | XON/OFF, EIA, ENQ ACK, Tandem | ✓ (DSU/CSU) | | ✓ (Level II and III) | \$1,500 (4 ports), \$7,200 (32 ports), \$500 (X.25), \$1,500 (modem) |
| Prentice Corp. Sunnyvale, Calif. | MX 90 | PP, ML | 16 to 112 | 50 to 19.2K asynchronous | 2M | 2; 64K | XON/OFF, EIA | | | ✓ (Level II and III) | \$6,000 (16 ports, 2 links), \$7,600 (32 ports, 2 links), NA (X.25) |
| Protocol Computers, Inc. Calabasas, Calif. | 2500 | PP | 11 to 27 | 50 to 9.6K asynchronous | NA | 1; 64K | XON/OFF, EIA | | | ✓ (Level III) | \$4,900 (11 ports), \$6,400 (27 ports) |
| Racal-Milgo Corp. Fort Lauderdale, Fla. | Omnimux 82 Series | PP, ML | 2 to 32 | 50 to 19.2K asynchronous, 1.2 to 19.2K synchronous | 614.4K | 2; 19.2K or 72K single link; 9.6K dual link | XON/OFF, EIA, ENQ ACK, Tandem | ✓ | | | \$2,026 (4 ports), \$11,000 (32 ports) |
| Racal-Vadic, Inc. Milpitas, Calif. | 7400 | PP | 4 to 16 | 50 to 9.6K asynchronous | 153.6K | 1; 19.2K | XON/OFF, EIA, ENQ ACK, Wang | ✓ | | | \$1,295 (4 ports), \$4,780 (16 ports and modem) |
| Scitec Communications Systems Newport, R.I. | NPX 25 | PP, ML | 4 to 16 | 50 to 19.2K asynchronous | 307.2K | 2; 19.2K each or 56K for single link | XON/OFF, EIA | ✓ | | | \$1,800 (4 ports), \$6,000 (16 ports), \$1,500 (modem) |
| Tellabs, Inc. Lisle, Ill. | 330 Dataplexer | PP | 4 to 32 | 50 to 9.6K asynchronous, 1.2 to 9.6K synchronous | 307.2K | 1; 76K (redundant link optional) | XON/OFF, EIA | ✓ | | | \$2,000 (8 ports), \$6,500 (32 ports), \$500 (redundant link), \$200 (V.35 interface) |
| Timeplex, Inc. Woodcliff Lake, N.J. | Quad Switching Microplexer | PP, ML | 8 to 48 | 50 to 9.6K asynchronous or synchronous | 460.8K | 4; 19.2K | XON/OFF, EIA | ✓ | | | \$2,800 (8 ports), \$9,000 (32 ports), \$1,500 (Prophet network management software) |
| Universal Data Systems, Inc. Huntsville, Ala. | 140BS | PP | 8 | 50 to 9.6K asynchronous | 76.8K | 1; 14.4K | XON/OFF, EIA | ✓ | | | \$3,995 (includes modem) |

NOTE: Products listed are representative for each vendor; many vendors offer several other multiplexers that could not be included due to space constraints. Users should contact vendors directly for more information.

DSU/CSU = Data service unit/channel service unit
EIA = Electronic Industry Association
ENQ ACK = Enquiry acknowledgment

ML = Multilinks

MP = Multipoint
NA = Not available
PP = Point-to-point

SOURCE: TMS CORP., DEVON, PA.
TDM = Time-division multiplexer

* Can be configured as master/slave with two links.

Letters:

Editor:

Integrated Network Systems, Inc. (INS) appreciates the editorial coverage that its products received in the article, "Protocol converters feel peer pressure" (NW, May 11). We'd like to clarify some information about INS products that appeared in the accompanying micro-to-host link chart.

INS, not ICOT Corp., manufactures the X.25 PC Adapter. Both this and our SDLC PC Adapter support 3287 printer emulation, and both possess log-on and password security features.

The two products also support graphics functions. Pricing for both is identical.

Thank you for your attention to this. We value *Network World's* comprehensive news and feature coverage of current events and issues in communications.

Virginia M. Davis
Marketing assistant
Integrated Network
Systems, Inc.

Editor:

Regarding John Hunter's review ("Analyzing LAN analyzers," NW, May 11), three points must be clarified.

First, network management encompasses much more than "measuring the traffic loading" and "injecting packets into the local-area network data stream to judge how well the system reacts to increased traffic." Network management includes security, configuration/directory, accounting, fault recovery and performance management.

Since there isn't a standard for network management, many LAN vendors have designed network management systems around their own networking products. These systems address these five aspects of network management to varying degrees, for specific networks only. On multivendor networks, such vendor-specific network management systems do not allow the network manager to get the "big picture" of network performance.

Second, both the HP 4971S and the LANalyzer are vendor-independent performance analyzers and troubleshooting tools. Neither analyzer attempts to address those aspects of network management to which it has no access. Both analyzers address only the fault recovery and performance management aspects of network management.

The two analyzers differ from the network management systems in that they provide network performance information gathered by observing data transmitted on the network, re-

gardless of the protocol and the vendors' equipment. Granted, the analyzers can't remove faulty products from the network. They can, however, help identify the faulty device. Even full-blown network management systems can't remove faulty devices from a bus configuration network, like an Ethernet, because the bus topology isn't set up to switch out faulty components as a ring topology network does.

Finally, the evaluation should include more than comparing the number of nodes an analyzer can monitor or the length of frames it filters out. Each analyzer should be compared on how well it meets users' needs. The evaluation should be based on actual use of the analyzers and an understanding of their capabilities.

It is my sincere wish that your readers have the insight to contact vendors of LAN protocol analyzers to gain a full understanding of how their needs can be met.

Maurice Kirwan
Marketing manager
Hewlett-Packard Co.
Colorado Telecom Division

John Hunter replies:

My review was intended to describe two products that are used for Ethernet testing. Although the International Standards Organization is considering standards for Ethernet testing, no standards currently exist. Therefore, I didn't fault either product for its inability to access certain information.

My comment concerning the inability of either product to do device isolation was intended to inform users who are accustomed to employing sophisticated network management equipment that such isolation cannot be done with these testers.

While it's true that individual products cannot be isolated on a bus structure, local nets are available that can find faulty devices by isolating the segment on which they are located.

Editor:

Your June 8, 1987 issue features an article titled, "EDI gives competitive edge," which I found of great interest. We are currently evaluating the best method for implementing electronic data interchange (EDI) for our business.

As was pointed out in the article, one of the major difficulties in the widespread use of EDI, especially for the small and medium-sized business, is the establishment and costs of the network necessary to effectively use EDI. Large businesses have

the problem of the sheer size of the network required.

The point I would like to make is that I read over and over about how the user community can see little benefit of Integrated Services Digital Network. It would appear to me that ISDN will be of great benefit to us in such areas as EDI. The ability to have the entire world on a data network will open up innumerable opportunities for networking.

When the telephone system was in its infancy, it was believed there would be only limited use of this system. I believe that if we do some imaginative and creative thinking about a worldwide data network, the opportunities for more effective ways to do business are almost endless.

Charles J. Knarr
Manager, data processing
Hub City

Editor:

The article, "Slow times for fast modems" (NW, June 1) contains the statement that, "The long-range forecast for 9.6K to 19.2K bit/sec modems shows declining markets and shrinking dollar volumes." After discussing this point with the author, I found he meant there is a declining rate of growth in the market overall.

Nevertheless, high-speed modems constitute the fastest growing segment of both the leased-line and dial modem markets, according to Dataquest, Inc.

Regarding the statement that "the quality of the [Direct Distance Dialing] network varies from passable to pathetic," the dial network is, in fact, getting better as more fiber-optic digital backbones are installed. This does not mean that there are not bad dial lines — there are. But to call the dial network at best passable is not justified by the facts.

The article continues with the statement, "Thus, those high flying modems operating in the 9.6K bit/sec range spend a good deal of their time shifting between primary and fallback speeds... Users find that their actual data throughput after error correction is mostly in the pedestrian sub-4.8K bit/sec neighborhood, despite the fact that they paid up front prices for the modems."

This may be true for some of the nonstandard high-speed dial modems on the market, but it is not true of Concord Data Systems, Inc.'s V.32 Trellis, which operates better at 9.6K bit/sec full duplex than V.22bis modems do at 2,400 bit/sec full duplex.

I am quoted in the article as saying, "There's no question that price is a factor, so we've cut ours [from \$3,495 to \$2,495] to help stimulate interest."

What I described with the

price change was the rationale for attacking the V.29 market for dial backup with V.32. A nonfeatured V.29 costs about \$1,650 and a separate dial backup box costs about \$700, a total of \$2,350.

Our V.32 modem, at roughly the same price, can perform the same solution with one backup telephone call — at half the telephone charges.

The article compares V.32 with V.29 but fails to clearly distinguish between traditional usage of V.29 on leased lines, and newer nonstandard approaches using V.29 half duplex over dial lines configured in a "pseudo duplex" manner that appears full duplex to the user RS-232 port. The author is correct in assessing problems with this approach in interactive mode.

Finally, Eric Arnum of International Resource Development, Inc. is quoted as considering asymmetrical modem technology to be bad news for supporters of V.32. At a recent Consultative Committee on International Telephony and Telegraphy meeting, I publicly stated that the rationale for promoting the asymmetrical modem was that it was less costly to implement than V.32 and would serve in some terminal-to-host applications.

Concord Data Systems is now questioning whether this will be true as time goes on. Consider the example of Bell 201 (V.26bis) modems, which operate at half duplex over the dial network. They operate at the same speed and are priced the same as V.22bis modems, which are full duplex and an order of magnitude more complex to implement.

A similar situation could happen with V.32 and asymmetrical modems in the future. The only thing that kept the asymmetrical modem under consideration was that the CCITT group in charge of facsimile transmission desired a 14.4K bit/sec asymmetrical modem.

V.32 has a bright future. The modem market is complex, however, making it difficult to gain a true understanding about what is going on. The V.32 may well be the workhorse all-purpose high-speed modem in the future, serving both asynchronous and synchronous applications over two- and four-wire leased and two-wire dial telephone lines.

C. Kenneth Miller
Chairman
Concord Data Systems, Inc.

Letters may be edited for space and clarity. Network World welcomes letters from its readers. Letters should be typed, double-spaced and no longer than 150 words.

They should be addressed to Editor, Network World, 375 Cochituate Road, Box 9171, Framingham, Mass. 01701-9171.

AT&T helps SDN user bypass BOC

continued from page 1

product can be used and identify network applications," DeLong said. "[AT&T] drove the situation, although the application was developed jointly."

AT&T acknowledged it will install a direct microwave link between Carter Hawley Hale Stores' facility in Anaheim, Calif., and an AT&T network point of presence eight to 10 miles away in Santa Ana, Calif.

DeLong predicted the replacement of the BOC-provided lines by the link will cut the site's communications costs by 60%, or \$7,500 a month. The savings assumes that a third party will finance the system over a five-year period.

AT&T has always maintained it will work with the local exchange carriers where possible. An AT&T spokesman said, "Our policy is to recommend that our customers work with their local telephone companies in local access situations. But when the user can't find a workable solution, we will help

them out. If the Bell operating company does not meet their needs, we won't walk away from the business."

But the company walks a fine line. On the one hand is the need to help customers control costs with solutions such as bypass, while on the other hand, the company cannot afford to alienate the BOCs, on which AT&T relies for billing services and as customers for network equipment such as central office switches. Although publicly downgrading the importance of bypass, AT&T has signed private agreements for different types of microwave gear from Digital Microwave Corp.

DeLong said if the Anaheim-Santa Ana bypass system works to his satisfaction, as many as 10 of the corporation's divisional headquarters will be tied to AT&T's network in this fashion.

AT&T will do far more than simply provide the digital microwave equipment, DeLong said. "They

will provide us with a turnkey solution. They will do all the legwork, including the system engineering, the crawling around and the system testing."

DeLong said the issue was first broached more than six months ago. "I think bypassing the BOCs is something AT&T will support more and more," he said.

Glenn Sullivan, executive director of marketing regulatory management for Pacific Bell, would not comment on the Carter Hawley Hale situation but said proliferation of bypass could mean trouble for business customers. "Our only recourse would be to apply to the California Public Utilities Commission for higher rates for business users," he warned. He said the BOC submitted a report to that commission, which delineates the types of bypass already under way in the state and how this business could affect the BOC's revenues.

DeLong said aside from cost, local-access line service outages and difficulty with troubleshooting efforts served as the other chief reasons to bypass Pacific Bell. "In-

stead of being dependent on the local telco's facilities, we will be dependent on the Digital Microwave equipment, which we think will be more reliable," he claimed.

One industry watcher claimed the bypass arrangement worked out between Carter Hawley Hale and AT&T represents an isolated incident and predicted AT&T will not offer bypass on a broad basis. Joaquin Gonzalez, vice-president of enterprise networking for the Gartner Group, Inc., a Stamford, Conn.-based research and consulting firm, said AT&T's willingness to provide bypass systems depends on the user. "This case does not signal the beginning of a broad AT&T effort to bypass the BOCs," he said.

The last publicized instance of AT&T working to coordinate BOC bypass occurred in May 1985. At the behest of Merrill Lynch & Co., Inc. AT&T agreed to use a fiber-optic network, operated by Teleport Communications, to tie Merrill Lynch's headquarters facility to an AT&T network entry point in Manhattan, N.Y. □

LAN Manager boosted

continued from page 2

firm in New York. "But Novell has between 110,000 and 120,000 operating systems installed today, a robust product family in the seventh or eighth generation of development that delivers a lot of the features promised by LAN Manager."

Battle lines between 3Com and Novell are likely to be drawn around independent software developers, analysts said. "The big battle's going to be who's going to draw in third-party developers to enhance what each company has done," said John McCarthy, research manager at Forrester Research, Inc. in Cambridge, Mass. "That's ultimately going to define the standard, not the fact that Microsoft rubber-stamped it or 3Com is involved or Novell's doing it."

Microsoft also provided new details on the LAN Manager's security and net administration features.

The LAN Manager's security system will include audit trails to track usage and detect unauthorized attempts to log on.

Network administration features include a check-out mechanism to allow automated centralized distribution of application software. This will enable network administrators to control the number of program copies downloaded from a server to a workstation.

For centralized control of larger nets, the LAN Manager includes advanced services such as built-in error logging, remote program execution, and automatic workstation notification of events such as printing complete. Net administration also includes a windowing interface to help users access the network services more effectively.

Both firms are also developing LAN Manager extensions by providing application developers with program interfaces for three key areas, according to 3Com's Alan

Kessler, a product manager:

- Electronic mail, providing a data structure and application program interface that will simplify the development of mail programs.
- Directory services, simplifying data access for users with multiple servers on a network and paving the way for distributed applications, programs that run on separate computers but function like a single application.
- Routing services, the ability to transparently move messages over different types of lower level networking schemes, such as Ethernet, IBM's Token-Ring and dial-up services such as MCI Communications Corp.'s Mail.

3Com President Bill Krause revealed the company's plans to develop products around the LAN Manager, starting with a new 3+ Open product line and series of upgrades. The new networking software will be based on OS/2 and the LAN Manager. The three upgrades will provide 3+ Open capabilities to 3Com's existing 3+ and 3Server3 products. They will include a mail function, interoperability with Apple Computer, Inc.'s Macintosh, an internet routing capability, features of the ISO protocol stack, backup, remote access, mainframe and minicomputer access.

The first upgrade will provide existing 3+ customers with 3+ Open capabilities. The second will be software that provides existing 3+ 3Server customers OS/2 station support. The third will enable 3Com's 3Server3 to be upgraded for approximately \$3,000 to an 80386 processor, including 1M byte of memory. The upgrades and 3+ Open products will be available by the end of the first half of 1988.

"We believe 3+ Open will provide the open systems platform needed for third-party software companies to develop a new generation of advanced server-based distributed applications and gateway services," Krause said. □

Sprint services debut

continued from page 2

could save 45 cents to 50 cents a call on a typical five-minute call with a US Sprint FONCARD, rather than an AT&T Calling Card," Self said. "It appears to me that most businesses will save 20% or more with a system like FONCARD."

With FONCARD, callers dialing a US Sprint 800 number — 1-800-877-8000 — access a US Sprint fiber-optic switching center. Both rotary and push-button phone users then dial 0, followed by the number they wish to reach. Push-button phone users then hear a request to enter a 14-digit FONCARD authorization number, while rotary dial phone users will be connected to a US Sprint operator at one of four regional locations, who will complete the call. The calls are then switched among US Sprint's 23 Northern Telecom, Inc. DMS-250 central office switches. Access to and from US Sprint's fiber-optic network is provided over local exchange carrier access lines.

FONCARD service is the first to rely completely on US Sprint's 800

service, which was announced at the recent International Communications Association conference. Commercial 800 service is expected to begin in September.

The expansion of US Sprint's operator assistance service will allow customers who have selected US Sprint as a primary long-distance carrier to reach a US Sprint operator from anywhere in the country by dialing 0. Previously, operator assistance was only available to US Sprint customers in certain regions. Besides completing FONCARD calls for rotary phone users, those operators will provide collect calling, person-to-person and station-to-station calls. Self said US Sprint could bring in additional income by making operator assistance available to more people.

If US Sprint is a customer's primary carrier, users will be able to dial 0 followed by the number they wish to reach and be connected directly to the company's fiber-optic network. Another FONCARD feature that mimics AT&T's Calling Card offering is the ability to enter the pound (#) key and make a second call without reentering the 14-digit authorization code. □

Micom gobble up Spectrum

continued from page 7

tion channel, unless you have a death wish," Kenber said.

But analysts raised doubts about whether or not Micom's sales force is sophisticated enough to peddle the ISDX. "In terms of integrated voice and data capabilities, this is a new area for Micom, and this is a much higher level of complexity than anything else they have done," said Andy Schopick, vice-president and senior analyst at Gartner Securities Corp.

"It's got to be direct sales, and it's got to be by a highly professional, competent sales force,"

DMW Group's Mayfield said.

Spectrum Digital's president and chief operating officer, Joseph Pisula, said users considering purchase of the ISDX should be encouraged by the Micom acquisition. "From an end-user perspective, it gives an ongoing assurance that Spectrum will be a major player in the T-1 market," he said.

Officials at Florida-based Paradyne, which announced in June it would sell the ISDX multiplexer, said they foresee no problem with Spectrum Digital's transition.

Under the terms of the acquisition, Micom will create a subsidiary called Micom Spectrum, Inc. to handle the ISDX. The deal is scheduled for closing by Oct. 30. □

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Early users give high marks

continued from page 1
other companies.

For years, Burlington Coat Factory transmitted sales and inventory information from its 91 stores throughout the U.S. to its data center in Lebanon, N.H., over value-added networks (VAN) during evening hours. During store hours, clerks used the VANs for credit card authorization and often waited as long as 40 seconds for a response from the network.

Tired of the expense and the slow response times associated with dial-up lines, Percy Young, Burlington Coat's manager of systems, decided last year to install an Equatorial Communications Co. VSAT network. All but one store location are now served by a two-way Equatorial C200 dish or a leased line link to a dish nearby.

The dishes transmit data to an Equatorial master hub in Mountain View, Calif., which is linked via three leased lines to Burlington Coat's headquarters. The network works at speeds of 1,200 bit/sec from the stores to the master hub and 19.2K bit/sec from the satellite to headquarters.

Simply put, Young said his company now has "better communications." By eliminating the local phone company completely, Burlington Coat has "full-time access to a system that has been highly reliable and has cut our credit card authorization response time down to five seconds. That alone could have justified the VSAT decision."

Burlington Coat has also benefited financially from the new network. Young said the company's monthly per-location communications cost has dipped to a flat \$290. Previously, it cost between \$400 and \$1,000 with dial-up con-

nctions to the VANs. The price of additional installations, he said, is "nominal."

Young has been especially pleased with the service Equatorial provides because, he said, "we're in the retail business, not the networking business."

Southland opted for a M/A Com, Inc. VSAT network when the "instability and tariff rates of our AT&T private data network got to be too much," said Bill McMinn, Southland's manager of voice and data communications. Last year, the company commenced installation of a two-way VSAT network that will, upon completion, support 2,500 end-user devices and 1.5 million transactions daily.

Southland, which owns the 7-Eleven convenience store chain, now has 60 locations up and running and 240 more slated for conversion to the network by August. The network, which connects to a master hub in Dallas, is used for supply and inventory applications — it processes store orders for next-day delivery from Southland's distribution centers.

McMinn said that while Southland has not yet realized any cost savings from the new network, he is confident the company will save money. "It's great not to have to worry about tariff increases," he said.

McMinn recently conducted an impromptu survey of stores on the network. He said 75% of the users questioned said the VSAT network is faster and more reliable than the private data network. The other 25% deemed the two to be roughly equal.

McMinn's only complaint thus far is the service he receives from Dictaphone Corp., with which M/A Com contracts for maintenance. "Dictaphone has not been up to our expectations at this point," Mc-

Minn said, citing a lack of experience as the causal factor in service delays. McMinn thinks this is because VSATs are new and no one has had much practice with maintenance.

Days Inns makes the claim of being the first hotel chain in the world to implement VSAT technology for its reservation system. Since January, the company has installed 100 Tridom Corp. two-way dishes as part of a 520-location network that will replace a dial-up network. Robert McGrail, Days Inns' senior vice-president, said the slowness of the dial-up network was the primary consideration in the migration to VSAT.

"I justified the implementation of a VSAT network for the reservation system alone," said McGrail, but the versatility of VSAT will allow him to run numerous other applications over the network as well. The company plans to provide credit card authorization and settlement over VSAT, as well as videoconferencing for training purposes and in-room cable television entertainment.

In addition to VSAT's flexibility, McGrail said the VSAT network, which supports speeds up to 9.6K bit/sec, is "10 times faster" than dial-up and considerably less expensive than dial-up or leased-line networks. The company estimates that its per-location communications costs amount to about \$8,500 per month. The dial-up arrangement Days Inns now uses costs about \$40,000 per month, per location.

Tridom, which manufactures and installs the VSAT dishes, contracts with GTE Spacenet Corp. for satellite capacity and customer maintenance. McGrail said he has no complaints about installation or maintenance. "Everything has gone smoothly," he said. □

CALENDAR

July 10, Indianapolis — Data Communications Testing Techniques and Products. Contact: Atlantic Research Corp., 5390 Cherokee Ave., Alexandria, Va. 22312.

July 13-14, Chicago — Managing Your System 85/75. Contact: *Business Communications Review*, 950 York Road, Hinsdale, Ill. 60521.

July 13-15, San Francisco — The New Standards: OSI and ISDN. Contact: Technology Transfer Institute, 741 Tenth St., Santa Monica, Calif. 90402.

July 13-15, New York — Management Skills and Techniques for New and Prospective Managers. Contact: School of Continuing Education, Seminar Center, New York University, 575 Madison Ave., New York, N.Y. 10022.

July 13-17, Santa Clara, Calif. — Omnicom Week: Open Systems Interconnection. Also, Aug. 17-21, Boston. Contact: The Omnicom Institute, 115 Park St. SE, Vienna, Va. 22180.

July 14-17, San Francisco — Digital Image Processing. Also, July 21-24, Washington, D.C.; Aug. 18-21, Anaheim, Calif.; Sept. 1-4, San Diego. Contact: Integrated Computer Systems, 5800 Hannum Ave., Culver City, Calif. 90231.

July 15-17, San Francisco — Network Wiring Techniques. Also, Aug. 5-7, Boston.; Aug. 12-14, Chicago. Contact: Datacomm Group, 55 Main St., Madison, N.J. 07940.

July 20-21, Denver — Commercial Image Processing Markets '87: Present and Future. Contact: Frost & Sullivan, Inc., 106 Fulton St., New York, N.Y. 10038.

July 20-21, Chicago — Understanding ISDN. Also, July 23-24, Washington, D.C.; Aug. 26-27, Toronto. Contact: Telecommunications Research Associates, P.O. Box 1200, Newark, Ill. 60541.

July 20-22, Arlington, Va. — Private Fiber Network Opportunities Conference. Contact: Tele-Strategies, Inc., Suite 100, 1355 Beverly Road, McLean, Va. 22101.

July 21, Chicago — TCP/IP WIN/3B Networking. Contact: Registrar/Data Communications and Network Training, AT&T, P.O. Box 45038, Jacksonville, Fla. 32232.

July 22-24, New York — Introduction to Data Communications and Networking. Also, Aug. 3-5, Boston. Contact: Data-Tech Institute, Lakeview Plaza, P.O. Box 2429, Clifton, N.J. 07015.

July 26-30, Minneapolis — ACUTA 16th Annual Conference. Contact: Association of College & University Telecommunications Administrators, 211 Nebraska Hall, Lincoln, Neb. 68588.

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► PRODUCT REVIEW

Matching T-1 multiplexers

BY JOHN J. HUNTER

Contributing Writer

T-1 multiplexers are among the most popular items on the communications manager's shopping list because they provide economical T-1 transmission facilities to handle a myriad of voice and data users.

Many T-1 multiplexers also allow maximum flexibility in networking, ranging from simple point-to-point transmissions, in which all channels terminate at the same end point, to DS0 switching, where the individual 64K bit/sec channels of T-1 composite can be directed to different locations.

Currently, users can choose from some 30 T-1 multiplexers. Some of the leading T-1 multiplexer makers are AT&T, Avanti Communications Corp., Codex Corp., Digital Communications Associates, Inc., Tellabs, Inc. and Timeplex, Inc.

Two units that have garnered much attention and market share are the Avanti UltraMux 1.5 and the Timeplex Link/2. These units offer similar data, voice and networking capabilities, and they can be configured in multinodal networks in which each node handles its own data and voice needs.

The nodes can operate point-to-point, or channels can be transmitted to different locations. Both products support six independent T-1 links per node, and redundancy is available on all critical components, including the T-1 driver.

Ultramux and Link/2 networks can contain up to 99 and 160 nodes, respectively, using cascading techniques. Link/2 accommodates a total of 500 ports; the UltraMux handles 192. Both units are D4/DS1-compatible. The UltraMux offers DS0 compatibility as an option. According to Timeplex, the Link/2 offers DS0 compatibility and substrate multiplexing as standard features.

DS0 capability lets both products take advantage of AT&T's Digital Access and Cross-connect System (DACS) DS0 switching facilities and lets them operate with permanently configured, or "nailed-up," connections.

Both multiplexers also support Extended Superframe Formatting (ESF) as an option. AT&T proposes to use ESF for testing, diagnostics and data error correction.

Networking

Link/2 and UltraMux support drop-and-insert and channel bypass applications. During drop and insert, neither product demultiplexes those channels that bypass the intermediate nodes. Link/2 allows seven such nodes, and UltraMux supports six.

Hunter is president of TMS Corp., a marketing management consulting firm in Devon, Pa.

The bypass capabilities can be used for alternate routing if the primary link to the desired end point should fail. The routing is accomplished by having each node store alternate route data for each link connected to it. Link/2 routes all traffic over an alternate route — provided sufficient bandwidth is available — and will route individual channels or groups over multiple secondary nodes if bandwidth is insufficient.

If the secondary data paths cannot handle all channels, Link/2 will selectively deactivate lower priority channels according to a priority level assigned by the system administrator. Sixteen priority levels are provided.

Avanti doesn't use channel priority during rerouting. If the secondary routes have traffic on them when alternate routing is needed, that traffic is deactivated to make room for alternately routed channels.

Data handling

Both multiplexers handle asyn-

chronous and synchronous inputs. Link/2 also accommodates isochronous and plesiochronous data. Applications for isochronous include nonclocked satellite transmissions and exceptionally noisy transmission facilities where clock synchronization can be lost. Plesiochronous is useful where modems dial in and connect to a clock that cannot be locked to the system's clock.

Both vendors have chosen to employ separate types of synchronous data modules to service low- and high-speed inputs. The Avanti modules have dual individually programmable ports. The low-speed unit accepts speeds ranging from 2.4K to 512K bit/sec, while the high-speed module handles speeds ranging from 2.4K bit/sec to 1.536M bit/sec.

The Link/2 low-speed synchronous modules have four ports, each separately programmable for speeds of 50K to 256K bit/sec. All low-speed ports can also operate at 128K bit/sec. The high-speed module has two ports, both of which run simultaneously at 1.152M bit/sec or can be individually programmed for rates ranging from 192K to 1.152M bit/sec.

In addition to normal data handling, the two multiplexers have enhanced capabilities for special applications. The UltraMux 1.5, for

example, permits asynchronous ports to operate asymmetrically, transmitting at one speed and receiving at another. Its synchronous data ports can also be configured with a low-speed asynchronous (up to 3% of the synchronous data rate) secondary channel that can be used with diagnostic modems for side channel reporting and control signals. Link/2 also handles secondary channels.

Link/2 offers a separate module for handling isochronous and plesiochronous data. The UltraMux also supports nonreferenced clocks with a combination of positive justification on the aggregate and C-bit stuffing at the channel level. Both multiplexers perform bit stuffing to compensate for differences in the configured receive channel speeds and the actual speeds.

Both multiplexers can also operate with external timing sources. By not having to reference a network timing source, user ports can employ clocks from different sources, such as Digital Data Ser-

offer excellent voice, data and networking capabilities and have been well-received in the marketplace. According to April 1986 figures compiled by International Data Corp. in Framingham, Mass., the Timeplex Link/1 and Link/2 garnered 27.5% of the marketplace, while the UltraMux 1.5 took a respectable 10%.

Both products have pluses and minuses. The Link/2 can be configured with more channels, supports more network nodes and does an outstanding job handling alternate routing. In addition, its new LPVS inserts more voice channels per DS0 than is possible with any conventional quantization technique.

The UltraMux is also a first-rate machine. Although it has less data/voice handling and networking capability than the Link/2, it does offer asymmetrical asynchronous channel operation. This saves bandwidth space in situations where large amounts of bandwidth are needed to transmit data but only a small amount is required for acknowledgment or control. The Link/2 does not offer such a capability.

The DS0 DACS compatibility available with both multiplexers is extremely valuable to users who want to route individual channels to remote locations. According to Roger Feldman, assistant vice-president and manager of communications systems for Texas American Services, Inc., a banking services company in Bedford, Texas, his company chose the UltraMux because of the DS0 option.

Texas American wanted to service its Houston office through DACS, but that service was not available. With the UltraMux, Feldman was able to service Houston without the need for a separate T-1 multiplexer and T-1 transmission facilities.

With such features, the UltraMux and Link/2 are definitely two of the leading T-1 products on the market today. However, they are not the top of the technological heap.

Avanti recently introduced a powerful new T-1 multiplexer called the Open Network Exchange (ONX). Scheduled for availability in the third quarter of 1987, the ONX supports as many as 16 T-1 aggregates and permits more than 100 nodes to be networked.

Each node supports 460 ports and accepts inputs from 16 other nodes. Up to 7,200 channels can be terminated or cross-connected per node. The ONX is DACS-compatible at the DS0 level and supports DDS data subrating to permit multiple low-speed channels to share each DS0.

Timeplex has also entered the upper reaches of T-1 multiplexing with its new Link/100 line of products, announced in late June. Specifications on the Link/100 were not available at press time. □

Two T-1 multiplexers compared

| | Vendor/Product | |
|---------------------|---|---|
| | Avanti Communications Corp. Newport, R.I./ UltraMux 1.5 | Timeplex, Inc. Woodcliff Lake, N.J./ Link/2 |
| Ports supported | 192 | 500 T-1 links |
| DS0 DACS compatible | ✓ | ✓ |
| Average price | \$29K | \$70K |

SOURCE: TMS CORP., DEVON, PA.

vice (DDS), microwave and satellites.

Voice channels

The voice-handling facilities of both products support pulse code modulation (PCM), continuously variable slope delta modulation and adaptive differential pulse code modulation (ADPCM) quantization schemes.

Avanti and Timeplex further the efficiency of voice transmission by converting 64K bit/sec PCM channels to 32K bit/sec ADPCM, thus doubling the units' voice-carrying capacity. This form of voice compression is part of the Link/2's standard ADPCM facility. UltraMux users who want the same capability need to order Avanti's Special Access Management System, which also provides UltraMux with its PCM and ADPCM facility.

For users who need more voice-handling capacity, Timeplex offers the Link Packetized Voice Server-40 (LPVS-40), which provides 10-to-1 voice compression, placing 40 voice channels in 224K bit/sec of bandwidth — the equivalent of four DS0s. Another version, the LPVS-8, packs eight conversations into one DS0.

Down to the wire

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